

**The City of Tucson's  
Stormwater Annual Report  
(Fiscal Year 2020–21)**

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**Annual Report Form**  
**For Phase I MS4's –Due September 30<sup>th</sup> Each Year**

**PART 1: GENERAL INFORMATION**

- A. Name of Permittee: City of Tucson
- B. Permit Number: AZS000001-2010
- C. Reporting Period: July 1, 2020 - June 30, 2021
- D. Name of Stormwater Management Program Contact:
  - Elizabeth Leibold, P.E., CPM, CFM
  - Mailing Address: P.O. Box 27210
  - City: Tucson    Zip: 85726-7210    Phone: (520) 837-4934
  - Fax Number: (520) 791-5902    Email: [Elizabeth.Leibold@tucsonaz.gov](mailto:Elizabeth.Leibold@tucsonaz.gov)
- E. Name of Certifying Official: Diana W. Alarcon, CAPP
  - Title: Director of Department of Transportation & Mobility
  - Mailing Address: P.O. Box 27210
  - City: Tucson    Zip: 85726-7210    Phone: (520) 791-4371
  - Fax Number: (520) 791-5902    Email: [Diana.Alarcon@tucsonaz.gov](mailto:Diana.Alarcon@tucsonaz.gov)

**PART 2: ANNUAL REPORT CERTIFICATION**

The Annual Report Form must be signed and certified by either a principal executive officer or ranking elected official; or by a “duly authorized representative” of that person in accordance with Sections 9.2 and 9.12 of the permit.

*I certify under penalty of law, that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.*

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Signature of Certifying Official (Department of Transportation & Mobility Director)

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Date

## PART 3: SUMMARY OF STORMWATER MANAGEMENT ACTIVITIES

### Overview

The City of Tucson (City) was covered under Municipal National Pollutant Discharge Elimination System (NPDES) Stormwater Permit AZS000001 from March 19, 1997 to August 31, 2011. During that time the City developed several programs to improve stormwater quality and maintain compliance with the permit. On September 1, 2011, Arizona Department of Environmental Quality (ADEQ) issued the City AZPDES Stormwater Permit AZS000001-2010. The City has received ADEQ's issuance of the new General MS4 Large (Phase 1) Permit, however the permit is being revised to address the State's surface water protection requirements. Therefore, this is the tenth reporting year of the previous permit's term. Like last year, ADEQ provided an extension to the 2011-2016 permit. This report covers the time period of July 1, 2020 through June 30, 2021.



**ARIZONA POLLUTANT DISCHARGE ELIMINATION SYSTEM  
AUTHORIZATION TO DISCHARGE STORMWATER FROM A MUNICIPAL  
SEPARATE STORM SEWER SYSTEM TO WATERS OF THE UNITED STATES**

This permit provides authorization to discharge under the Arizona Pollutant Discharge Elimination System (AZPDES) program, in compliance with the provisions of the Arizona Revised Statutes (A.R.S.) Title 49, Chapter 2, Article 3.1, and the Arizona Administrative Code (A.A.C.) Title 18, Chapter 9, Article 9, and amendments thereto, and the Clean Water Act as amended (33 U.S.C. 1251 et seq.). The Permittee, the

**City of Tucson**

**P.O. Box 27210**

**Tucson, AZ 85726-7210**

is authorized to discharge stormwater from the municipal separate storm sewer system (MS4) operated by the City of Tucson to waters of the United States in accordance with the terms and conditions set forth in this permit.

This permit becomes effective on July 1, 2021.

This permit and the authorization to discharge expires at midnight, June 30, 2026.

Signed this 30th day of December, 2020.

The anticipated new MS4 Permit was issued by ADEQ to the City with an effective date of July 1, 2021. As of the writing of this report, ADEQ is revising the permit to include verbiage for the new State Protected Surface Waters which are expected to help protect surface water systems that are not included in new WOTUS but were previously included in EPA's Appendix B or are nominated for the State's surface water protection.

The revised Construction General Permit (CGP) was issued and became effective July 1, 2020. As a responsibility to the community, City Stormwater Management staff continue to work with the Phase I Stormwater Coalition on the stakeholder input for the various other ADEQ stormwater permits (Deminimus and Pesticide permits) that are anticipated to be issued by ADEQ within the next fiscal year period. With Environmental Protection Agency (EPA) Waters of the U.S. (WOTUS) changes that went into effect July 1, 2020, considerations were discussed in public meetings for the State's surface water protection for non-WOTUS water bodies. EPA with the United States Army Corps of Engineers (ACOE) had worked together to propose a WOTUS definition update in order to better clarify American water resource management associated with the Clean Water Act of 1972.

Previously Federally regulated watercourses are anticipated to be regulated or partially regulated by the State. The State has developed State Protected Surface Waters that will be regulated for some of the water bodies that were previously covered under WOTUS that are no longer covered federally. Stormwater Pollution Prevention Plan (SWPPP) authority was transferred from Federal to State in 2002 (NPDES to AzPDES). Benefits of State delegated authority were seen, including granting special permit authority for the City to review SWPPP submittals for proposed construction projects in lieu of applicant paying ADEQ review fee. This accommodation allows for faster development review and issuance of grading permits with associated stormwater pollution prevention plans and local stormwater quality issue are efficiently addressed. The new Construction General Permit was also issued in 2020 and although it has simplified language, it tends to have more focus on Phoenix area grading project development standards that are different from the City. The City awaits feedback from the development community on the new DeMinimus Permit and Pesticide Permit that are also under revision by the State. [https://static.azdeq.gov/permits/azpdes/cgp\\_permit.pdf](https://static.azdeq.gov/permits/azpdes/cgp_permit.pdf)

City Stormwater Management supports State-based management of local surface runoff since it will be better regulated by the State who are being asked to 1) assure that surface water regulations are simplified; and that 2) new State Protected Surface Waters regulations are arid climate based. Stormwater quality is very important to the Tucson constituents for many reasons. The City and property owners have high density of private and public potable water wells in the city limits. Stormwater runoff is allowed to flow through public and private property that provide recharge opportunity to the aquifers in the washes and regional watercourses such as the Santa Cruz River. Development designs typically use detention basins. The Stormwater Quality Storm (SQS) rainfall depth for Tucson varies with impervious cover (imp) as follows: 0.30" for <25% imp, 0.40" for >25% to 70% imp, and 0.6" for >70% imp, per Mayor and Council adopted regulations. Retention may be waived due to existing constraints, such as existing subsurface contaminants, proximity to bank protection structures, or poor infiltration conditions (exceeding maximum drain down time of 12-hours or 24 hours depending on watershed size). The majority of the Tucson area has hydrologic soil groups "C" & "D" and there are many locations of caliche, which makes detention a sustainable design option for basins. Detention basins also lower the potential for mosquito-borne illnesses.

Per Plan Tucson, arid climate-based regulations that are reasonable to Tucson, and Arizona as a whole are encouraged. City Stormwater Management supports ADEQ's efforts to develop State-based surface water regulations that provide a simplified approach for stormwater management purposes as well as the development community while still assuring clean surface water.

COVID-19 has had limited impact to the Stormwater Management Program. Like ADEQ, and as directed by EPA, functions of surface water quality activities by Stormwater Management staff continued. Minor changes due to COVID-19 including but not limited to: wearing and using additional PPE, increasing physical distancing to 10-feet, and limiting industrial and commercial inspections to reduce face-to-face inspections, were implemented. The biggest impact to the Stormwater Program was the cancelation of community outreach events that are rescheduled to the coming fiscal year. Various stormwater meetings have continued in the field and via online meeting applications including Zoom and Microsoft Teams.

The City has completed this year's requirements based on an extension to the 2011-2016 permit, as summarized in this annual report. Next year submittal of annual data will be based on the new MS4 permit requirements. Most of the programs developed under the previous permit have been continued

or refined, and are currently utilized to protect stormwater quality. In 2019, in keeping with 2010 permit requirements, the City adopted in 2019 the Complete Streets Principal Guidelines which incorporate green infrastructure principals in the planning and construction of City infrastructure. The Mayor and Council approved Green Stormwater Infrastructure Fee (GSI) Program which is active through the Tucson Water Department with assistance by the Department of Transportation & Mobility Stormwater Management, and funds green stormwater infrastructure capital plans and maintenance activities as part of our MS4 permit. The GSI program was implemented in Fall of 2020 and projects are underway with the coordination between Tucson Water and Department of Transportation and Mobility.

Low Impact Development has become part of the culture in design. Other requirements under the 2021 permit have fine-tuned the stormwater program. With a high number potable wells and the community's commitment to a clean environment per Plan Tucson, the City treats stormwater management as an important aspect of keeping our water clean and safe.

## **I. Stormwater Public Education and Outreach**

### **A. Stormwater outreach topics and events**

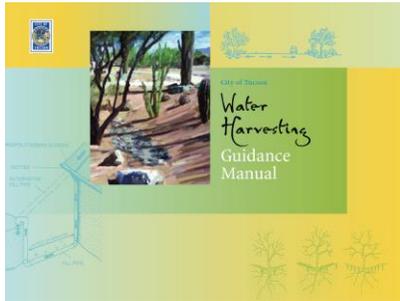
This section identifies the City departments, Environmental and General Services, Parks and Recreation, Tucson Water, Human Resources, Risk Management, Housing and Community Development, Tucson Fire, Planning & Development Services, Tucson Fire and Transportation and Mobility, that have stormwater programs which are involved in public outreach activities that enhance public awareness and understanding of stormwater pollution prevention. In addition to City departments, regional assistance was provided by Pima Association of Governments (PAG), Tucson Clean and Beautiful, Pima County DEQ, and Southern Office for ADEQ. PAG continues to have reduced funding for Stormwater Programs for this fiscal year. This has reduced the number of cooperative outreach programs in which the City participates, with PAG and other jurisdictions. PAG continued to emphasize stormwater pollution prevention and related topics through virtual PAG committee and subcommittee meetings (such as Management / Technical / Watershed committees), listserv communications, social media and other online resources. Outreach Topics and number of people reached are presented in Part 4, Table I: Stormwater Public Education and Outreach.

#### **1. DEPARTMENT OF TRANSPORTATION & MOBILITY (DTM)STORMWATER PROGRAM**

DTM takes the lead in City Stormwater Management, working with and encouraging other City departments with their specific assigned stormwater tasks and responsibilities. City Stormwater Management also works closely with Tucson Clean and Beautiful (TCB), Pima Association of Governments (PAG), Pima County Regional Flood Control District (PCRFCD), and the University of Arizona (which has a MS4 Small Permit).

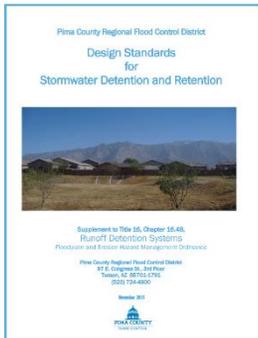
Stormwater Management's Public Awareness Program continues to encourage the public to keep stormwater clean and report stormwater concerns. This year's Stormwater Public Education and Outreach messages included: promoting waterharvesting, preventing non-storm discharges, keeping gray water onsite, reusing rainwater for onsite irrigation, implementation of green infrastructure within Green

Streets, promotion of detention systems over retention, directing residential pool backwash to sanitary cleanouts and not discharging to unpaved alleys, using sediment controls for all types of grading activities, picking up pet waste, providing general guidance for erosion protection, and educating the public about other stormwater quality information. Although there were challenges with COVID-19 in attending outreach events, there were still opportunities for the few events that occurred and one-on-one education with the public during responses to complaints and customer service field inspections and calls.



The *Water Harvesting Guidance Manual* is used for new development and has been in place since 2005 when it was adopted by Mayor and Council. See City website: <https://www.tucsonaz.gov/tdot/water-harvesting>. Hard copies are available through DTM and Planning and Development Services Department (PDS) Engineering.

This manual is designed to assist the development community in compliance with Unified Development Code requirements to maximize use of rainwater harvesting in new development. Water Harvesting is considered low-impact development and a Best Management Practice (BMP) that promotes infiltration when possible, as well as stormwater detention (the ultimate sustainable strategy for most areas within the City), and serves to reduce pollutants in stormwater runoff. Additionally, residents with existing homes or businesses can use the *Water Harvesting Guidance Manual* to retrofit their property to harvest stormwater. This year, 6 *Water Harvesting Guidance Manuals* were distributed to the general public.



In June 2021, the City adopted the 2014 (Revised February 2015) PCRFC Design Standards for Stormwater Detention and Retention Manual. The manual provides additional design requirements for first flush retention and additional guidance on low impact development. As part of this adoption the City maintained its higher development standards for detention due to the City's urbanized nature.



To prevent illegal dumping in storm drains, the City's ongoing catch basin identification program has identified locations where there is a high potential for illegal dumping. These locations have been marked with a weather-resistant metal disk (bottom left picture) bearing the slogan, "Only Rain in the Drain."

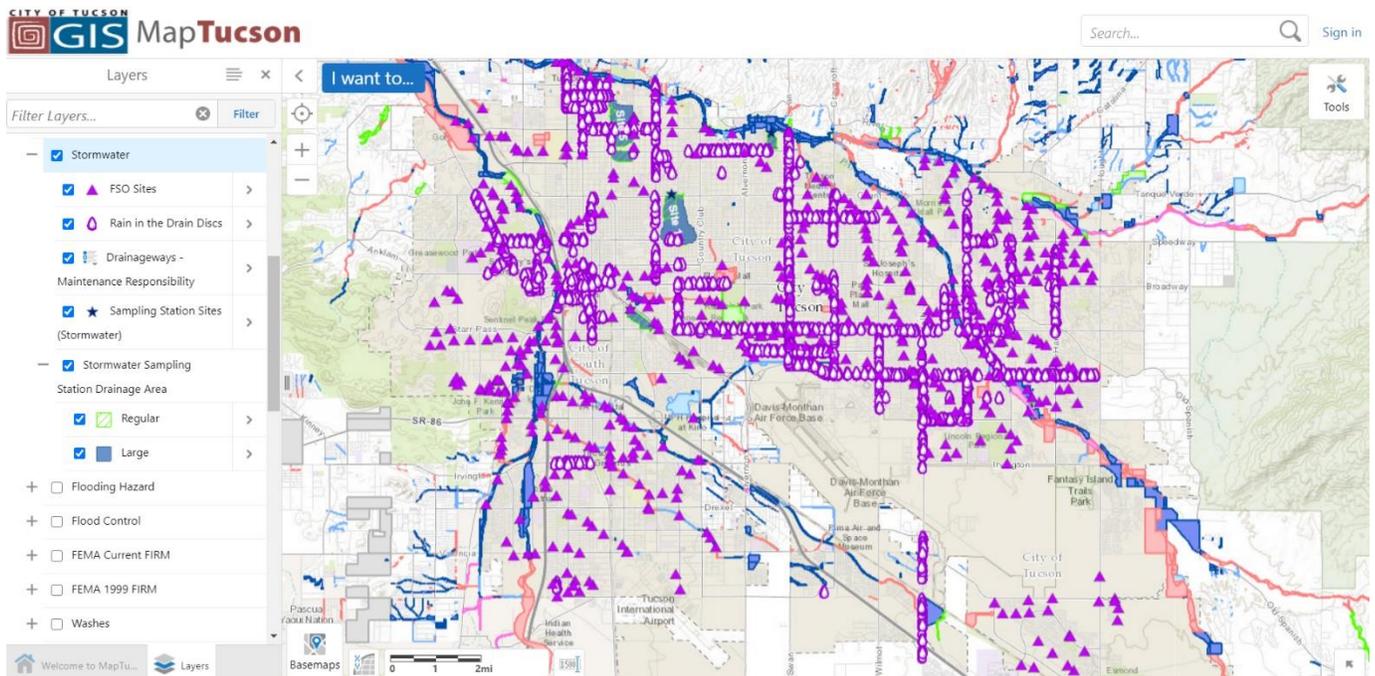
The slogan is also used on the new watercourse signage for protected riparian floodplain watercourses, to replace existing fading purple wash signage (as shown in the picture on the right). Staff is working with Tucson Police Department (TPD) to determine code references that will assist TPD with homeless and illegal dumping activities and compliance.





The message “Only Rain in the Drain” was used on a variety of promotional giveaway materials (listed in Part 4, Table 1, page 32). “Only Rain in the Drain” is the City’s stormwater slogan and is used to encourage everyone to think about how they impact stormwater quality in their day-to-day activities. Additional catch basin markers will be installed on future Capital Projects.

To further increase awareness of the City’s stormwater infrastructure, and to comply with permit requirements, the City developed and maintains a comprehensive GIS map (MapTucson). This map depicts stormdrain infrastructure, watercourses, and detention basins managed by the City of Tucson. See map below showing basins and catch basin markers.



The City has included various stormwater quality features on MapTucson:

- Major outfalls used for field screening
- Catch basins marked with Only Rain in the Drain discs
- Stormwater sampling station sites
- Stormwater Sampling site watersheds and sub-watersheds
- Identification of maintenance responsibility
- Other features for floodplain management

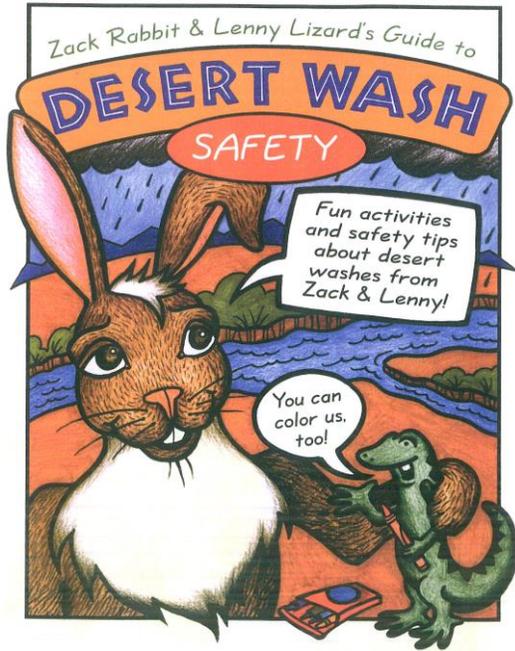
For each stormwater sampling site, MapTucson includes the contributing drainage areas as well as master basin management area watersheds within the Tucson Stormwater Management System. This drainage infrastructure information can be accessed by the public through the City’s geographic information systems website <https://www.tucsonaz.gov/gis/map-resources>

City GIS staff and Street Inspectors continues to update the database for stormdrain structures in the City right-of-way. See also section IV.E of the Stormwater Report for more information about Mapping.

In this reporting period, the DTM Stormwater Management Program was unable to participate in the regular outreach events where distribution of outreach materials could occur other than online Monsoon Safety Awareness Week. The following public outreach events that the staff hope to be able to attend for FY 2021-2022 that help encourage stormwater pollution prevention: Ward IV Back-to-School Bash (July 2022), Tucson Association of Realtors EXPO at the Tucson Convention Center, E-Week Park Mall Event, Tucson Children's Earth Day at Children's Museum, EHSS Vendor Fair at Raytheon, Monsoon Safety Awareness Week, Family Festival in the Park (November 2021) and Arizona Bilingual Back-to-School Bash sponsored by Ward I and Ward V. These events were either not active this reporting period, staff was unable to attend, or event organizers had canceled, or they rescheduled due to COVID-19. The 2021 Monsoon Safety Awareness Week Safety Fair that was held June 13 - 19, 2021, was limited to website information found through <https://monsoonsafety.org/news/index.htm>. Stormwater Management has worked with the local Juneteenth coordinator and is currently planning on attending the new Event in June 2022.

During this fiscal year Stormwater Management and ADOT discussed stormwater post-construction activities to look at how coordination between Stormwater staff can improve response to spill incidents in the I-10 corridor. When vehicular incidents cause petroleum or other spill issues that drain from the freeway areas to nearby storm drain systems in ADOT and City areas of responsibility, coordination is very important. The City will work with ADOT to address the post-construction retrofit feasibility assessment requirement for the new MS4 permit (section 4.8.B.3). For current post-construction inspections, there are 4 types of inspections that the City performs (or City requires private entities to perform), for post-construction: 1) Private inspections of drainage facilities performed by property owner's civil engineer; 2) Private facilities checked by City Inspectors for general conformance, to verify permanent stormwater / flood and erosion controls are performing effectively at the site. (Inspectors note any deficiencies, needed maintenance or potential modifications. Letters are then sent out to owners and their Civil Engineer shall verify that the facility is in compliance with approved plans, check for watershed breaching, prepare appropriate recommendations to address any needed maintenance or modifications, and schedule to implement corrective actions. Follow-up inspections by the City occur.) 3) Public facilities are also inspected by City Inspection staff for stormwater compliance and/or maintenance purposes. 4) City Civil Engineer inspections for levees, regional detention basins, and other stormwater improvements that require detailed compliance inspections. On December 8<sup>th</sup>, 2020 a City levee maintenance plan was adopted by Mayor and Council.

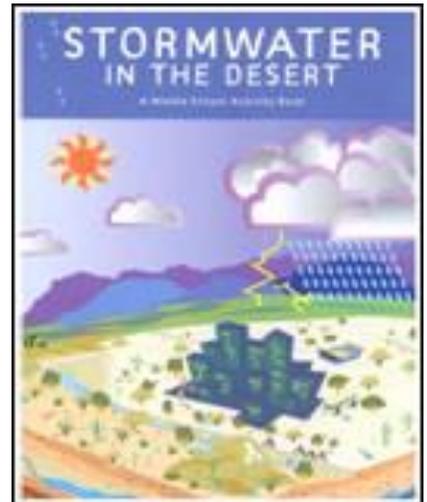
*The Desert Wash Safety Activity Book*, a booklet that promotes basic stormwater



quality messages in a child-friendly format, was provided to younger residents and continues to be popular among elementary schools, recreation centers, libraries and other facilities. These activity books were distributed in both English and Spanish. Since this educational book's initial City adoption in 2001, various other jurisdictions have also used it for public outreach.

The City understands that education is one of the most important aspects of a stormwater program. Once a person is educated on how storm quality is impacted and can appreciate the importance of individual responsibility toward stormwater quality, then the community can see the effects of stormwater management activities. This particular handout continues to be the number one most popular piece of outreach material for the Tucson area.

*Stormwater in the Desert*, another booklet produced by the City, is geared toward students in middle school and blends aspects of Tucson's *Water Harvesting Guidance Manual* with messages about flood safety and stormwater quality. At this time, the City is looking at updating the book so it was not provided last school year. We will be moving to a hard copy edition to get the booklets out to the students.



Teachers at local schools, as well as at schools within other Arizona counties, have inquired about being provided more booklets, as well as obtaining the electronic copy for their own educational efforts (we are working on this effort but have limited funding).

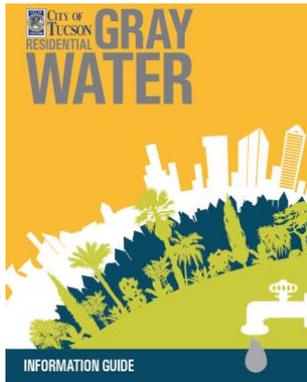
The City continues other outreach activities related to Illicit Discharge Detection and Elimination (IDDE) during this FY 2020-2021, including neighborhood-focused educational outreach projects for areas indicating multiple IDDE issues. (See section C.6 for specific projects during this fiscal year).

In this report period, the Stormwater Management Program continued to distribute information packets containing guidance on complying with the both the AZPDES General Permit for Construction and the Multi-sector General Permit for Industrial Activities. Topics included are listed in Part 4 Table 1.

## 2. PLANNING AND DEVELOPMENT SERVICES DEPARTMENT (PDSD)

PDSD continued outreach with the public through online and some field meetings with contractors and developers. Site Pre-Construction meetings are performed for those grading projects that require a SWPPP, which provides an opportunity to assist contractors with understanding stormwater inspections that will occur before, during and after grading construction activities. There continues to have been some functional changes to PDSD's stormwater activities due to COVID-19. PDSD has moved to remote inspections through all electronic options such as FaceTime, Teams, Zoom, etc. If site Inspectors are visiting a location, they were taking more precaution including physical distancing and wearing of masks. PDSD continue to handle most pre-construction meetings remotely, or if on site with limited in-field attendance.

Post-construction maintenance of retention/detention basins were encouraged through direct mailings and inspections. Staff attends Southern Arizona Homebuilders Association (SAHBA) meetings to provide information. Part 4, Table I includes outreach topics and numbers reached. The department's Engineering inspection staff performs private, permanent, post-construction, drainage facility inspections annually and works with Stormwater Management staff to develop an updated electronic system (using SAMS Software) to generate the letters for compliance issues found. During inspections data is collected to generate the letters for post-construction corrections for basins or other drainage facility.



Gray water use has been a continually increasing water source for property owners in the City. Although the new gray water codes have been adopted to help conserve water, restrictions are in place to protect stormwater quality.

For instance, effluent, or “black water” is not allowed to enter the MS4. Treated effluent is allowed to enter the MS4 only when special permitting is obtained from ADEQ. Also, Gray Water codes do not allow for discharge off the parcel where it is generated.

Information about the City's gray water code and regulations and guidelines are found in the following documents generated by PDSD and Tucson Water departments:

[https://www.tucsonaz.gov/files/pdsd/permits/brochure%20final%200910\\_1.pdf](https://www.tucsonaz.gov/files/pdsd/permits/brochure%20final%200910_1.pdf)

[https://www.tucsonaz.gov/files/water/docs/Gray\\_Water\\_Information\\_Guide.pdf](https://www.tucsonaz.gov/files/water/docs/Gray_Water_Information_Guide.pdf)

<https://www.tucsonaz.gov/files/agdocs/20080923/sept23-08-527a.pdf>

[https://www.tucsonaz.gov/files/pdsd/permits/Gray\\_Water\\_Ordinance11089.pdf](https://www.tucsonaz.gov/files/pdsd/permits/Gray_Water_Ordinance11089.pdf)

<https://www.tucsonaz.gov/water/gray-water-rebate>

<http://legacy.azdeq.gov/enviro/water/permits/download/graybro.pdf>

[https://www.tucsonaz.gov/files/pdsd/codes-ordinances/Grey\\_Water\\_Options\\_FINAL\\_.pdf](https://www.tucsonaz.gov/files/pdsd/codes-ordinances/Grey_Water_Options_FINAL_.pdf)

Although Stormwater Management inspection staff within the Department of Transportation & Mobility inspects sites for IDDE gray water complaints, the PDSD Inspectors provide grading and stormwater pollution prevention guidance and

assistance to contractors during their construction inspections on new development projects including industrial, commercial, and residential developments on private properties.

### 3. TUCSON WATER

Tucson Water engages in a wide variety of educational outreach activities intended to increase awareness and encourage citizen action on water-related issues. The training and workshops reported in Part 4, Table I are focused on rainwater harvesting techniques that reduce potable water use for irrigation and improve stormwater quality. With the new Green Stormwater Infrastructure (GSI) Program workshops and Rainwater Harvesting Workshops were held by Tucson Water with 910 attendees during the reporting period.

The City continues to ensure reliable water resources for our community through the Santa Cruz River Heritage Project. For decades, the City has been successfully using reclaimed water for irrigation at 50 parks, 65 schools, 18 public golf courses, by spreading the reclaimed water over golf course areas, fields and other vegetated areas. Although the majority of reclaimed water is used for irrigation, a new Tucson Water project adds up to 2.8 million gallons of recycled water daily to the Santa Cruz River. This reclaimed water re-enters our water system from an outfall located at the east side of the Santa Cruz River, near the confluence of the Santa Cruz West Branch watercourse, onto the surface of the Santa Cruz River bed, and eventually percolates through the ground to enter the aquifer. This water remains for future use, helping to provide for the future needs of our community.

<https://www.tucsonaz.gov/water/reclaimed-water-facts>

In addition, Tucson Water provides outreach with their Water Conservation Program, Tucson Water Efficiency Rebate Program, Arizona Project WET, and the Environmental Education Exchange.



Desert flora thrive from stormwater runoff during the monsoon

4. ENVIRONMENTAL & GENERAL SERVICES DEPARTMENT (EGSD)HOUSEHOLD HAZARDOUS WASTE PROGRAM

For EGSD reporting purposes, stormwater activities are reported separately by each area of responsibility. The Environmental Services stormwater staff in EGSD manage community outreach related to waste reduction and recycling. Participation in the City's Household Hazardous Waste Program had limited operation during COVID-19. Outreach materials are still available to the general public through direct mailings and the following website: <https://www.tucsonaz.gov/es/household-hazardous-waste> In addition, the Household Hazardous Waste (HHW) Program provided online information to businesses through their Small Business Waste Assistance Program (SBWAP) – see website: <https://www.tucsonaz.gov/es/sbwap>

5. TUCSON CLEAN AND BEAUTIFUL (TCB)

TCB, a nonprofit organization, is an important partner to and is supported by the City's Stormwater Management Program. TCB's mission is to preserve and improve the environment, conserve natural resources, and enhance quality of life through educational and hands on programs. These programs target Tucson's diverse population. They include Adopt-a-Park & Public Areas where volunteers clean up litter; buffelgrass and invasive plant removal, as well as Trees for Tucson public space and neighborhood tree planting. TCB also manages community outreach related to waste reduction and recycling. This includes coordination of a live and recorded Recycling Information Line. The Recycling Information Line serves as a clearing house for area residents. It offers information on recycling and waste reduction opportunities. Topics include curbside recycling, neighborhood recycling centers, Household Hazardous Waste, and other available community environmental programs. This helps improve stormwater quality through proper disposal of materials. Callers also may request brochures, information directories, and other resources to be sent by mail or email. TCB provides information online through its website at the Reduce-Reuse-Recycle Directory. An interactive learning opportunity with professional actors teaches recycling and waste reduction concepts to elementary age school groups each year. TCB works to establish community partnerships increasing opportunities for participation in available recycling and waste reduction programs. This includes responsible electronics recycling, the Master Recycler training series, and the annual Recycled Art Showcase. In addition to these efforts, TCB offers monthly email newsletters and a website; [www.tucsoncleanandbeautiful.org](http://www.tucsoncleanandbeautiful.org)



These online resources complement information provided by phone, in person, and in brochure format, highlighting local environmental education events and community volunteer opportunities. These programs, as well as TCB’s central message, encourage the public to act responsibly in simple ways that improve and promote stormwater quality. TCB offers a litter-free school program and administers the Neighborhood Scale Green Infrastructure (NSGI) Stormwater Harvesting Program - for Tucson Water. Part 4, Table 1 provides an overview of the scope and audience of TCB programs. TCB will also be our partners with the implementation of the Green Infrastructure Program.

<https://www.tucsonaz.gov/water/nsgi>

## 6. PIMA ASSOCIATION OF GOVERNMENTS STORMWATER MANAGEMENT WORKING GROUP (PAG)

Pima Association of Governments, the federally designated **208 Water Quality Planning Organization** in Pima County, conducts wastewater and stormwater quality planning activities. In this role, PAG coordinates the region’s Stormwater Management Working Group to address stormwater management issues and support PAG member jurisdictions (including the City’s large Phase 1 MS4 as well as smaller Phase 2 MS4’s in the region) in meeting their annual stormwater permitting requirements. Outreach funding is provided through Federal Highway Administration funds for surface transportation pollution mitigation.

### PAG - Activities and Impressions

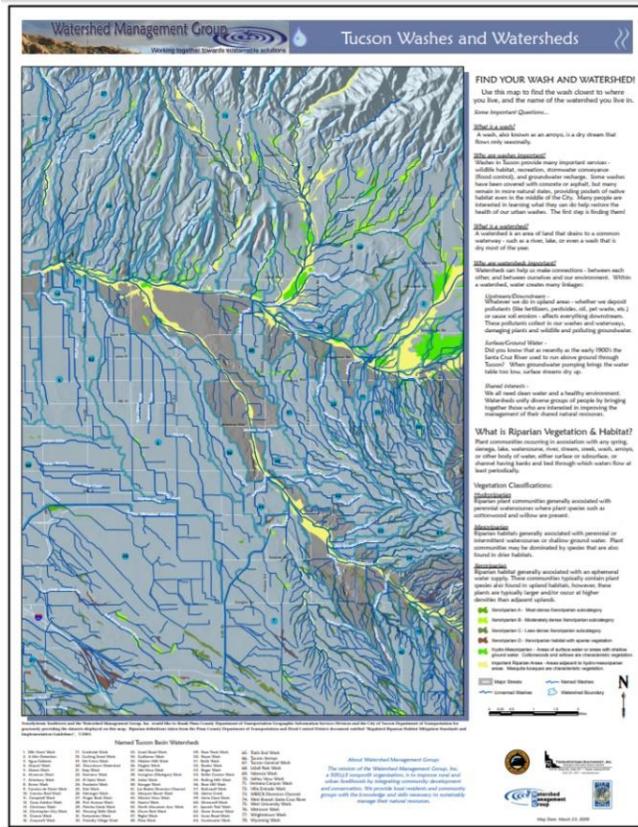
During Fiscal Year 2020-21 (July 1, 2020 – June 30, 2021), PAG continued to meet Designated Planning Agency goals under section 208 of the Clean Water Act by supporting regional stormwater pollution prevention efforts and integrating stormwater mitigation into other PAG planning activities. PAG continued to emphasize stormwater pollution prevention and related topics through



committee and subcommittee meetings, listserv communications, social media and other online resources. SWMWG members were invited to relevant committee meetings. SWMWG members were invited to relevant committee meetings. Communication metrics include 2,800 emails to WPS and EPAC listservs1 (stormwater-related topics), 2,682 stormwater-related posts on PAG social media (Facebook, Twitter), 2,554 hits at the PAG Green Infrastructure Prioritization Tool (online interactive map), 663 hits for the PAG stormwater and green infrastructure webpages, 326 emails to PAG’s stormwater listservs2

(SWMWG, MS4s) and 213 WPS, EPAC and MS4 meetings (3 stormwater-related topics; 4 meetings). PAG’s outreach activities and estimated impressions (views) for each activity are detailed in Table I. in Part 4.

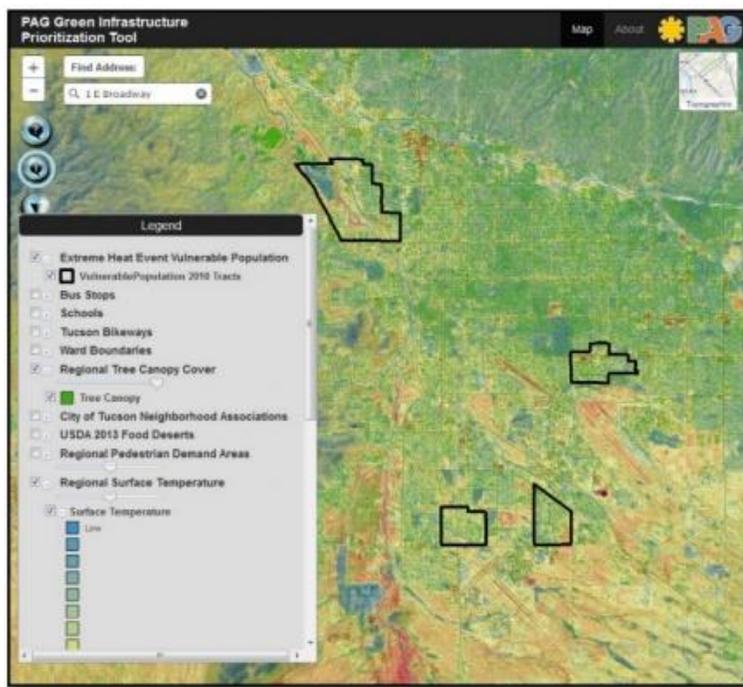
PAG's website includes tips and downloadable resources to encourage ongoing stormwater pollution prevention by the public, educators and construction industry professionals, in compliance with state and local regulations. The website was updated this year with feedback opportunities for members.



PAG's 2020 Areawide Water Quality Management Plan (208 Plan) update was approved by the Arizona Department of Environmental Quality (ADEQ) in May 2021 and by the U.S. Environmental Protection Agency (EPA) in June 2021. Appendix A documents regional stormwater quality conditions and includes a strategic action plan to address these and other regional water quality issues. Expert input from SWMWG members was solicited and incorporated throughout the draft 208 Plan's development.

PAG featured the updated Watershed Map of Eastern Pima County, originally created for stormwater engagement, within PAG's Riparian Health Assessment Summary for Monitoring Year 2018-19. The report presents PAG's creek monitoring results and emphasizes the importance of protecting water quality in the region's Outstanding Arizona Waters

and PAG 208 Plan priority waterbodies. By integrating these topics, the messages reach a wider audience of environmental managers, community leaders and the public.

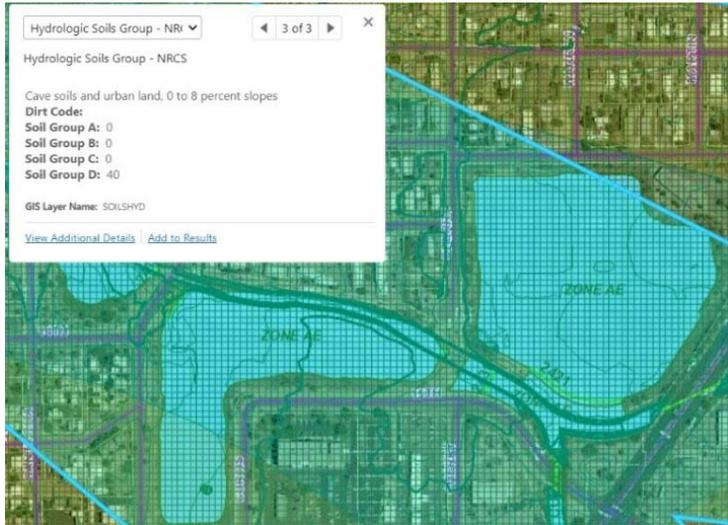


Green Infrastructure Prioritization tool has been updated with more data layers, such as a park score index, to enhance data driven decision making for stormwater infrastructure planners.

(<https://gismaps.pagnet.org/PAG-GIMap/Map.aspx>)

PAG's draft Stormwater Outreach Toolkit was distributed to local representatives of MS4s for feedback. This serves as a visual guide to PAG's stormwater pollution prevention messaging, materials and imagery, with links to PAG resources available online. Upon completion, the guide will be available on PAG's website.

<https://gismaps.pagnet.org/PAG-GIMap/>



The is working with PAG to request that soil data be added to this tool so that users can make decisions for retention types of water harvesting project designs based on soils that provide percolation, otherwise the use of detention designs can be used to guarantee drain down time compliance and assure sustainability.

Data can also be found in MapTucson, by turning on the City Flood Data theme set, and also turning on Hydrologic Soils Group theme.

<https://maps2.tucsonaz.gov/Html5Viewer/?viewer=maptucson>

Pima County DEQ provided the 2020-2021 Executive Summary of the Evaluation of the Pima County Clean Air Program Campaign and Clean Water Campaign Survey (May 2021), revealing community awareness and behaviors around stormwater quality. Link to the survey results:

[https://webcms.pima.gov/UserFiles/Servers/Server\\_6/File/Government/Environmental%20Quality/InfoEdOutreach/CAPSurveys/Pima%20DEQ%202020-2021%20Executive%20Summary%20Final.pdf](https://webcms.pima.gov/UserFiles/Servers/Server_6/File/Government/Environmental%20Quality/InfoEdOutreach/CAPSurveys/Pima%20DEQ%202020-2021%20Executive%20Summary%20Final.pdf)

In one of the survey sets of questions, survey participants were asked where the water flowing into Tucson street stormdrains end up, and the responses were: River or wash (46%), Groundwater (14%), Water treatment plants (13%), Sewage plants (11%), and Canals (5%). Consistent with the last two annual surveys, 25% of respondents indicate that they do not know where stormwater flows to after it enters a storm drain. Per survey findings, 86% of respondents perceive Tucson to have a “moderate” stormwater pollution problem. Data in these annual reports assist Stormwater and Floodplain Management with focused topics and areas for future outreach.

### PAG Accomplishments

Pet waste bag containers that can be clipped to belt loop are popular outreach items for Stormwater Management. PAG’s "Scoop it. Bag it. Trash it." decal stickers are featured on more pet waste stations along The Loop (shared use / bicycle path) which runs through the City of Tucson and other multiple MS4’s in the region. These stickers help to encourage community to clean up after their pets as a stormwater pollution prevention measure. Jurisdictions and community partners display the decals on pet waste stations and signage along the Loop, in public parks and in neighborhoods. Pima Animal Care Center (PACC) produced and installed approximately 50 fill-it-yourself bag dispensers at various pet waste station locations last fiscal year.



While PAG has run out of stickers, PAG can share the design with agencies interested in printing more. Pima County NRPR has shared the template for volunteers interested creating more pet waste stations.

## II. Stormwater Public Involvement Program

### A. Activities, Number of Participants

#### 1. STORMWATER MANAGEMENT PROGRAM

The City's Stormwater Management Program website contains a contact page allowing citizens to "Report a Concern," including spills that threaten to enter the storm-drain system, dry weather flows, construction or industrial site runoff, and illegal dumping in stormdrains or washes. Constituents can either e-mail [Stormwater@tucsonaz.gov](mailto:Stormwater@tucsonaz.gov) or call (520) 791-4251. The City website received 7,805 hits as listed in Part 4 Table II.



#### 2. ENVIRONMENTAL SERVICES HOUSEHOLD HAZARDOUS WASTE

During the reporting period public participation in the City's Household Hazardous Waste (HHW) Collection Program was tracked. The City operates the HHW facility at the Los Reales Landfill (HHW-LR) and accepts wastes from area residents. The HHW-LR recycling facility, located at Los Reales Landfill, accepts the following materials:

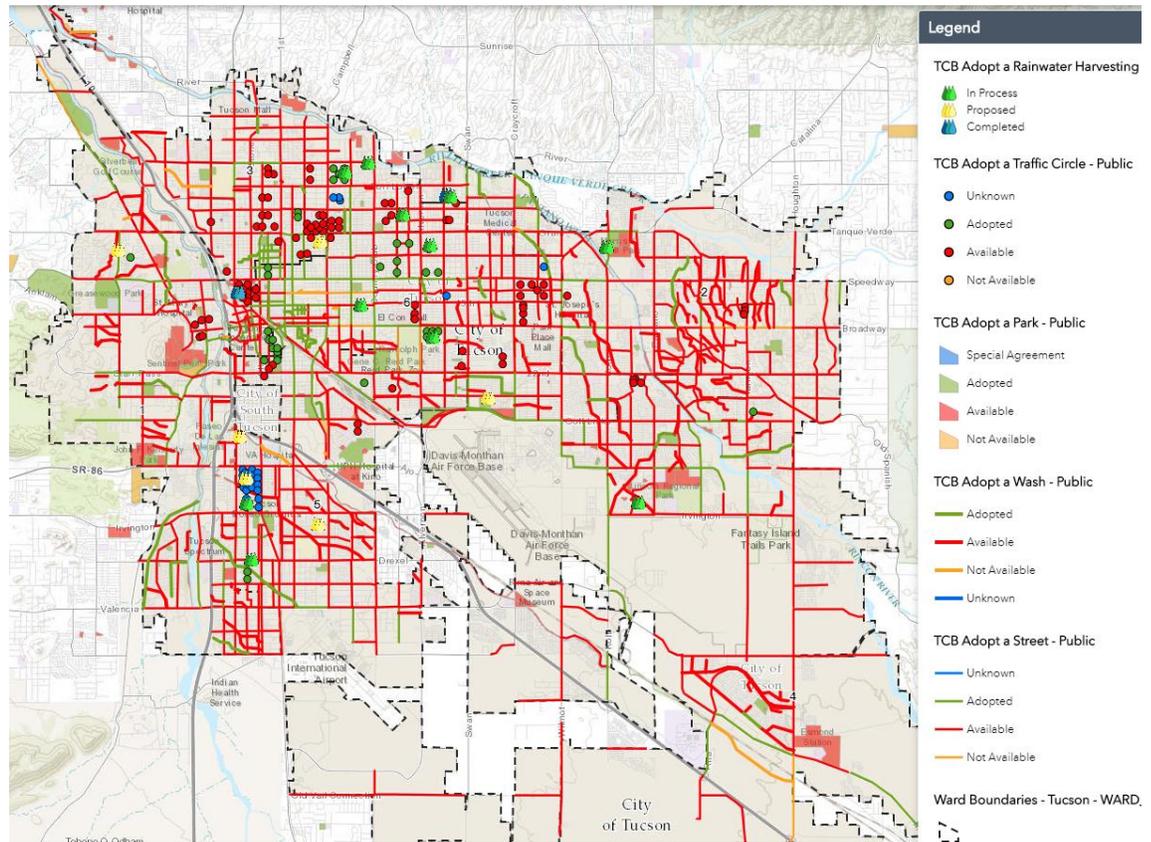
- auto fluids
- batteries
- solvents
- pool chemicals
- pesticides
- paints

Small businesses are encouraged to participate in responsible water disposal through the Environmental Services Department's Small Business Waste Assistance Program (SBWAP). The SBWAP provides an affordable and environmentally safe alternative to qualifying businesses - Conditionally Exempt Small Quantity Generators operating within Pima County - for proper disposal of their hazardous waste at the Household Hazardous Waste facility (HHW). Registration is required with company certification of generator status.

Businesses and the general public participated in the HHW program by dropping off household hazardous waste at the designated collection facilities, at remote collection events or home pick-ups. Public participation in the Household Hazardous Waste Program, and operating costs for this reporting period are summarized in Part 4, Table II.

#### 3. TUCSON CLEAN & BEAUTIFUL

Through the TCB Adopt a Park and Public Areas litter cleanup program, over 300 public sites in the Tucson area have been officially adopted by community land stewardship volunteer groups. Volunteer removal of litter and illegally dumped material from public areas helps to reduce impacts to stormwater quality. Volunteer efforts continue to have a positive impact on the community, with 528 Service hours provided in the past FY 2020-2021 and a growing number of sites with community stewards volunteering regularly along with one-time projects.



<https://cotgis.maps.arcgis.com/apps/webappviewer/index.html?id=d40db845579c4b208906ad55358a7e52>

The above map shows locations of adopted or available Parks, Streets, Washes and Traffic Circles from the TCB Adopt A Site Program. See the following website for more information: <https://tucsoncleanandbeautiful.org/adopt-a-park-public-areas/>

The Trees for Tucson program provided over 6,023 affordable desert-adapted shade trees to the public within the past year, including area residents for their own homes, and for community volunteer planting projects. Desert-adapted trees help trap pollutants to improve water quality and reduce runoff volumes, prevent soil erosion, reduce electricity usage, reduce atmospheric CO<sub>2</sub>, reduce heat island effect, and add to community aesthetics and livability. TCB continues to partner to help meet the Mayor Regina Romero's Tucson Million Trees campaign (started in 2020 with the goal to plant a million trees by 2030) which is part of the City's Emergency Declaration for Climate Change to increase tree canopy and lessen heat island effect.

### III. Illicit Discharge Detection and Elimination (IDDE) Program

#### A. Municipal Employee Training

##### 1. Specialized Stormwater Inspector Training

Stormwater Management team members, within DTM, assigned to carry out functions of the stormwater management program, participated in training/discussion sessions almost

every week for 2020-2021. The topics included all activities related to the stormwater program, including training, complaints, sanitary sewer overflows, illicit discharges and dumping, sampling activities, use of new stormwater software, sample results and action needed, field screen outfall investigations, watercourse impacts from homeless encampments, Multi-Agency Inspection Team (MAIT's) inspections, industrial, commercial and construction site inspections, procedures, policies, pesticide complaints, active outreach programs, and enforcement protocols. DTM stormwater inspectors and construction Inspectors completed their annual Occupational Safety and Health Administration (OSHA) training that included direction on which department to contact if they encounter a spill. The Stormwater Inspectors were to receive RCRA, pesticide, and Hazmat Safety training however there were scheduling issues due to COVID-19 and this training is being scheduled for FY 2021-2022.

Awareness videos for new employees, inspection training videos, and public outreach videos are available, and a schedule and training programs are in place, and provided to new employees at first year orientation and required annually thereafter. The titles of the videos are, "Illicit Discharge Detection and Elimination", "Rain Check", and "Public Outreach".

Stormwater Management keeps a spreadsheet of all DTM employees that have stormwater training. This spreadsheet is available at the Stormwater Manager's office.



Construction Inspection staff are trained by SAMS software engineering consultants to assist with trouble-shooting sampling equipment issues.

When there are lightning, strong winds, or other safety issues at the sampling site, wet weather sampling is aborted to protect the safety of the Stormwater Management Inspectors. Inspectors use online applications to view threats during IDDE investigations, sampling activities and other stormwater inspections. Safety during field activities is discussed regularly at Stormwater Management weekly meetings.



Construction Inspection staff were provided training on stormwater sampling equipment from current engineering staff, consultant, and previous inspection staff

## **2.Other Specialized Training**

The City offers staff specialized training to help reduce non storm discharges and prevent pollutants from being exposed to stormwater. During this reporting period, coordination between City departments occurred to help identify training topics and establish improved tracking measures. Specialized 40 hour Hazardous Waste Operations and Emergency Response (HAZWOPER) training was to be provided to fire personnel, who are first responders to spills however this reporting period had to reschedule this training for the Stormwater Inspectors due to COVID-19. Some staff were able to attend the 8-hr HAZWOPER refresher training which is intended to be taken annually by City staff including Tucson Water, Tucson Fire, DTM, and EGSD, who come into contact with hazardous materials during the course of their duties. Confined Space training is given to those staff that have stormwater sampling duties and other responsibilities around

stormdrain conduits. Training for Confined Space Entry or refresher courses are scheduled for the Stormwater Inspection staff.

### **3. Non-Stormwater Employees**

Non-stormwater employees received training from Safety Services on topics including: spill prevention and response, proper storage, handling and disposal of used oil and other toxics, reporting spills, reporting spills that threaten the stormdrain system, and reporting suspicious non-storm flows. This training was provided at orientation in the “City of Tucson Employee Safety Handbook” and by watching our Stormwater DVD “Municipal Storm Water Pollution Prevention Storm Watch” and answering questions after viewing the DVD. City employees also have the opportunity to view a Power Point presentation called “Stormwater Awareness Training” through “City Learn,” which is still being updated to include an audio component. City Learn is an online program that allows staff to take training individually. See also information in Part 4.

Risk Management in the Business Services Department now provides safety training and resources from “The Safety Group” (TSG). This year TSG created “TSG 2020 Spill Response and Spill Management Training” in an effort to bridge a gap in this area since training had not been provided since 2016. During this fiscal year 67 employees completed the HAZWOPPER 8-hour training. TSG provides awareness level training on spill response in its “It Could Cost You Your Life” (ICCYL) Training. TSG trained 159 employees from July 1, 2020 through June 30, 2021. TSG tracks the number of new employees who receive training at an awareness level through TSG’s new ICCYYL training\*.

## **B. Spill Prevention and Response**

### **1. Municipal Facility Assessments**

During the previous report year, Stormwater Management Program assessed City owned and operated facilities for the presence of materials that have the potential to impact stormwater quality, and prioritized these facilities based on the risk of these impacts. The City had utilized a Multi-Agency Inspection Team (MAIT’s) to perform annual inspections of all City owned and operated facilities. These inspections had occurred each Thursday at a designated facility, however for this reporting period, as well as 4 months of the prior reporting period, MAIT’s has been discontinued due to COVID-19 related concerns for group field meetings. MAIT inspections were suspended in March because of the COVID-19 pandemic and the requirement to limit the number of collective employees in one group and the requirement to adhere to physical distancing requirements. The team had consisted of representatives from City agencies with expertise in Industrial Hygiene, Occupational Safety and Health Administration (OSHA) Compliance, Risk Management, Fire Code, and Stormwater Quality Compliance. Facility assessments have been conducted in conjunction with the MAIT’s inspections, and were focused on determining the potential for each facility to impact stormwater quality. Special programs and SPCC’s have been established for higher risk facilities in order to address special higher risk stormwater needs for these types of facilities. Special programs and SPCC’s have been established for higher risk facilities in order to address special higher risk stormwater needs for these types of facilities.

Since Risk Management / TSG has discontinued the MAIT’s inspections and alternative Stormwater Inspection is being developed. Facility assessments will be conducted in

conjunction with Floodplain Administration and DTM Engineering assistance, and will focus on determining the potential for each facility to impact stormwater quality as well as flood and erosion hazard safety issues. Risk Management has offered to provide a list to DTM Stormwater Management of the facilities to develop the new inspection protocol.

## 2. Identification of Higher Risk Facilities

The City continues to annually review, inspect, and prioritize the list of high risk municipal facilities. Onsite control measures are used to minimize potential stormwater exposure.

During this reporting year 12 municipal facilities were identified as higher risk facilities: Thomas O. Price Service Center, Fred Enke Golf Course, El Rio Golf Course, Silverbell Golf Course, Randolph Golf Course, Reid Park Zoo, Fire Department Maintenance (HAZMAT), Household Hazardous Waste, Los Reales Landfill (AZMSG-61695), Sun Tran Bus Terminal (AZMSG-61745), Sun Tran Bus Terminal Northwest (AZMSG-61747), and Sun Van (AZMSG-61746).



Perfluoroalkyl and polyfluoroalkyl substances (PFAS) including Aqueous film forming foam (AFFF) have updated health advisory limits per Environmental Protection Agency. These substances have been a topic of interest for property owners in the Tucson and surrounding areas and Tucson Water has been providing monitoring. Although AFFF is a highly effective fire suppressant, the Tucson Fire Department has committed to not use AFFF for training purposes, and also for certain small fire situations AFFF is not used for some fire responses.

Auto accident fire, where Firefighters used Class A foam product (not AFFF). Note also temporary berm surrounding stormdrain.

The Thomas O Price Service Center had the SPCC updated in 2019. The report was generated by a consultant for the ES/GS department and training to use the new SPCC was discussed, and training will continue to be provided.

## 3. Spill Tracking

As part of the City's Hazard Communications OSHA training, the City developed a Spill Response Program, S-020C, used to provide direction on how to handle spills. Part of the program includes tracking of the number of spills that occurred at City facilities. Vehicular fluid releases (mostly hydraulic oil spills) reported by Environmental/General Services, continue to occur. Each release is evaluated; and remediated by on-site staff utilizing spill kits located on the vehicles or were remediated by Tucson Fire Department with support from DTM, as required by the program. City first responders contained and cleaned up approximately 20 additional other spills City-wide. The Spill Response procedure S-020C was reviewed by interdepartmental administrative staff in 2021 and is expected to be re-evaluated and updated in 2022.

## C. Dry Weather Screening of Major Outfalls

### 1. Outfall Inventory

In the early 1990s, the City followed the procedures outlined in 40 CFR 122.26 to identify 500 outfalls that have been subsequently utilized to detect non-storm flows. Over the years, development and infrastructure improvements have eliminated or replaced several outfalls, and new outfalls have been added to the inventory, to maintain the 500 outfalls required under the municipal stormwater permit. These outfalls have been mapped on the City's Geographic Information System (GIS) Stormwater Map, and can be viewed by accessing the map online: <https://maps.tucsonaz.gov/maptucson/> Also during this reporting period, new major outfalls to the regional watercourses are being inventoried and added to the list that outfall to the (WOTUS) Santa Cruz River. Data is being added to the new SAMS software system.

### 2. Outfalls Inspected

In this report period, the Stormwater Management Program through Streets staff conducted dry weather outfall screening inspections of at least 100 outfalls located in the central portion of the City.

### 3. Priority Outfall Inspected

During this year, 14 priority outfalls were inspected. These priority outfalls are inspected annually. The locations of the priority outfalls are upstream from Lakeside Lake in the Atterbury Wash Watershed. There were no dry weather flows found at any of these outfall locations.

### 4. Results of Dry Weather Screening

Of the outfall inspections conducted July 1, 2020 - June 30, 2021 in conjunction with watercourse inspections, several dry weather flows were discovered. The causes of these flows were determined to be from over-irrigation and swimming pool discharges. Several sites were referred to the City's Department, which is responsible for regulating water waste (to help conserve water). The pool discharges are being addressed through interdepartmental meetings with property owners in the field and at City offices to ensure compliance with stormwater codes.

### 5. Eliminate Illicit Discharges (Cross Connections and Other Sources)

The City annually inspects areas of the stormdrain system for the presence of illicit discharges. The locations are based on; industrial facility inspections, complaints received from the public, reports from City Departments, and reports from other agencies. The City reviews all Capital Improvement Projects and private development to assure connections to storm drains versus sanitary sewer lines are properly addressed, and that designs meet all stormwater, water, and building codes.

### 6. Reports of Dry Weather Flows

In this report period, the City received 155 reports of dry weather flow and responded to all of them. The reports were received from citizens, other City Departments, Ward offices, and other agencies. Reports of dry weather flow are considered to be a priority for response and inspection. Investigations conducted revealed that the source water originated from a variety of sources including: pool flushing / draining, pool back-washing, grey water, sanitary sewer overflows, reclaimed water discharges, restaurant food waste spillage, potable water releases, fire suppression runoff, site runoff, power washing sidewalks or trash receptacle areas, homeless encampments, and diesel spills during vehicular accidents.

The cost of cleaning up watercourses has increased. The population of homeless individuals



who are using public watercourses for personal bathing and other non-compliant stormwater activities has also increased. Inspectors have observed people washing undergarments in drinking fountains also used by children at public parks. At one location, a toilet was set up at one

homeless encampment on the top of wash embankment and a pipe was placed to discharge toilet into the wash. Homeless encampments continue to be one of the greatest staffing efforts for watercourse maintenance. Police continue to perform sometimes daily efforts to keep homeless out of the stormdrain conduits and post Homeless Protocol signage and warn homeless of pending encampment removal and clean-up of a wash. Fire Department puts out fires in box culverts and large stormdrain pipes. Parks and Recreation staff spend time cleaning park facilities. DTM Stormwater Management Inspectors report encampment and homeless activities. DTM Street Division remove homeless encampment debris and watercourse blockages from public drainageways. At locations where the homeless encampment has hazards at the site (drug paraphernalia / “sharps”, human waste, chemicals, unknown materials, or other hazards), environmental specialists are needed. Special services provided by outside environmental hazard clean-up companies with HAZMAT training were utilized again for this reporting period to perform clean-up where hazardous conditions were indicated, with a cost to DTM of \$45,488.

There were 5 discharges reported for July 1, 2020 through June 30, 2021 to the City’s Sanitary Sewer Overflows (SSO’s). Each sanitary release was properly cleaned up, sanitized, and flushed and vacuored, as required. The flows were from both private and public sanitary systems and associated overflowing cleanouts, manholes, grease traps, and/or broken pipes. City Stormwater Management and Pima County Reclamation Waste and Recycling Department continue to work together to update contact information so that quick response could be provided to these SSO discharge incidents. Although email and phone correspondence has been efficient, the City is seeking copies of the final reports from the County.

There was a 50% increase in pool related complaints from last fiscal year. There were approximately 25 reports of pool draining or pool filter backwashing. Although inspectors provided outreach materials last year, the City still experiences pool discharge issues. The complaints include ponding water, water leaving property boundaries, erosion, and minor flooding issues. Greywater handouts and pool discharge flyers were handed out to property owners and Inspectors took the time to explain regulations.

These inspections resulted in verbal warnings, and education and outreach flyers were provided. In areas where there were discharges into an unpaved area, the discharger was directed to immediately stop the flow, remove the discharge pipe or hose from the area, and ensure that backwash water remains on-site or is directed into a sanitary sewer cleanout. Pool discharge flyers and contact information were left at properties when no one answered the door during the Stormwater Inspectors’ visits.

For the downtown student housing areas, Stormwater Management staff has requested courtesy notification a week (or more if possible) prior to anticipated code-compliant pool

flushing as well as other de minimis discharges such as annual waterline and fire testing for each student housing building. Several of the student housing management staff were contacted to explain stormwater regulations including the prohibition of pool backwash discharges.

This year's neighborhood IDDE response events have included 3 outreach events for portions of neighborhoods where alleged dog poop violations and pool backwash discharge issues have occurred. Similar to last year, there were two neighborhoods, on the east side of town, where Stormwater Management Inspection staff performed an outreach program where they distributed flyers to several dozen residential properties.

There was also one neighborhood which was canvased, where dog poop was found in the adjacent channel on the other side of back patio walls where residents owned dogs. Follow-up inspections are needed to monitor effectiveness of this dog poop outreach program.

Targeted areas are first identified by creating a map of the area where alleged IDDE violations are occurring, then Inspectors walk door-to-door, provide information flyers and handouts, and discuss stormwater compliance and why awareness is important to stormwater quality.

Spill reports continue to be discussed by staff to figure out the best ways to reduce hydraulic leaks using the Spill Response procedure (S-020C) in multi-departmental group meetings.

There were 10 discharge complaints that originated from gray water which is an increase for FY 2020-2021 from previous recent years. These complaints, including offsite discharging, obstruction of pedestrian and vehicular access, and subsidence, were addressed through inspections by Stormwater Management staff. For this reporting year, most of the incidents involved discharging off the property, which is not in conformance to Tucson adopted gray water regulations.

Stormwater Management staff made contact with resident to stop the offsite discharge, provided copies of the gray water code and gray water regulations, and explained requirements. The information that was frequently used included explanation that:

- ◆ Gray water must be used onsite for irrigation purposes;
- ◆ Gray water must keep within 2-foot setbacks of property lines
- ◆ No gray water flows may leave the property.

[https://www.tucsonaz.gov/files/pdsd/codes-ordinances/Grey\\_Water\\_Options\\_FINAL\\_.pdf](https://www.tucsonaz.gov/files/pdsd/codes-ordinances/Grey_Water_Options_FINAL_.pdf)

[https://www.tucsonaz.gov/files/pdsd/permits/Gray\\_Water\\_Ordinance11089.pdf](https://www.tucsonaz.gov/files/pdsd/permits/Gray_Water_Ordinance11089.pdf)

There were no formal reports from Tucson Water regarding line break repairs in this reporting period resulting in outflows exceeding 50,000 gallons. Water department staff immediately responded to repair the large main line break.

The remaining reports of discharges were from: construction sites that did not need a SWPPP, allowable De Minimis Permitted discharges, water line repairs, or flushing that resulted in verbal warnings or requests for better communication.

One IDDE inspection for notice of violation at a construction site in September 2020 included sampling of discharge following requirements of 40 CFR 122.26(d)(1)(iv)(D), and determined the following pollutants and conditions were indicated: Phosphorus, Barium, Nitrogen and pH 6.1. Discharge had ponded in gutterline near construction site and correction action to remove discharge using wet vacuum and clean area was completed that afternoon.

Other reports of discharges were from commercial operations, referrals, excess irrigation, and public complaints. All of the spills or discharges reported were inspected by City staff and were confirmed as cleaned and pollutant materials were properly disposed of at designated disposal sites.

## **IV. Municipal Facilities Pollution Prevention/Good Housekeeping Program**

### **A. Municipal Employee Training**

#### **1. NEW AND CURRENT EMPLOYEES**

All new City employees attend orientation where they each receive a “Safety First Manual.” This employee safety manual includes details on what to do with spills. This report year there were new employees that attended orientation. Additionally, City employees attend mandatory OSHA training during their first year and ongoing employees receive annual OSHA training through the City’s online program entitled “City Learn.” The numbers of employees trained are tabulated in Part 4. Because classes are taken individually, no dates can be reported for the majority of employees. For those employees who do not have access to a computer, the City Learn training is conducted in a class setting. OSHA training for City employees included the following key subject areas:

- Spill Training: Topics covered include prevention, response, and practices to prevent or minimize spills or discharges to the City’s stormdrain system.
- Proper Handling, storage, transport and disposal of used oil and other toxics and hazardous materials and wastes to prevent spills, exposure to rainfall, and contamination of stormwater runoff.

More extensive training on these subjects is provided for first responders and staff who routinely work with hazardous or toxic products. These new employees receive the preliminary 40 hours HAZWOPER training, and existing employees receive the HAZWOPER refresher classes.

#### **2. SPECIALIZED STORMWATER TRAINING**

DTM stormwater staff receives extensive training during their first year of employment and refresher training every other year. New employees who work in the stormwater area each receive a copy of the Stormwater Ordinance (SWORD), the Stormwater Management Plan (SWMP), Gray Water codes, Pool Discharge procedures, the adopted TSMS Watercourse Maintenance regulations, as well as copies of the AZPDES Construction General Permit, and AZPDES Multi-Sector General Permit.

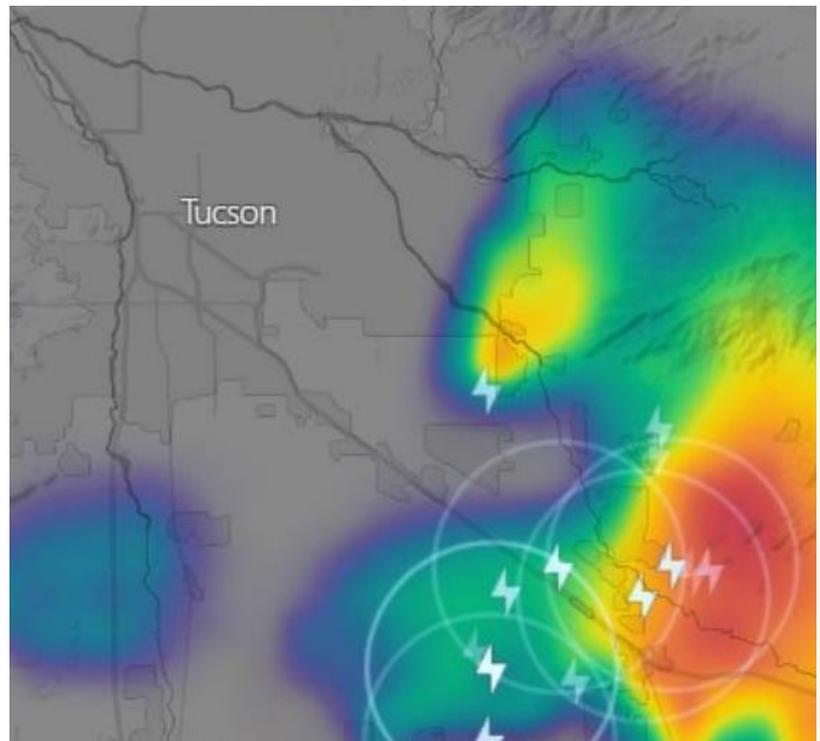
During the reporting year, 16 Construction Inspection staff continue to be cross trained to assist with construction SWPPP Inspections and with Illicit Discharge Detection and Elimination Inspection. Others were trained in Municipal Facility Controls and Industrial/Commercial Controls as well as MAIT’s inspections. All were trained in Post Construction Controls. For this fiscal year, nine project managers were trained in the new ADEQ online NOT-NOI website called myDEQ. Several Users and a RCO were established.

Of the approximate 20 Department of Transportation & Mobility Construction Inspectors trained in stormwater responsibilities, three of the employees are assigned to work in the stormwater sampling and industrial inspection responsibilities. Three staff were trained for Multi Agency Inspection Team inspections.

Weekly training occurred with DTM's Construction Inspectors focusing on the following:

- Recent incidents and how handled.
- Issues at construction sites during excessive rains.
- Discussions on industrial inspection results and activities.
- Wet weather sample results and dry weather screening findings.
- Success/failures/participation with outreach activities.

On-going training for PDSO Stormwater staff included frequent review and discussion of City Ordinances, development standards, and stormwater regulations. New staff are trained by existing staff in a mentoring process. See Attachments at end of report for Stormwater Staff Training List.



Heavy rain, lightning can be seen approaching City sampling site areas from the southeast.

## B. Municipal Facility Assessments

### 1. MUNICIPAL FACILITY INVENTORY

To date, the City has identified over 200 City owned and operated facilities that have been tabulated and are maintained on an inventory list. The list includes the latitude/longitude, facility contact, the operational status (operating or closed), the Standard Industrial Classification (SIC) code(s) that best reflects the services provided by each facility and a brief description of operational practices that could potentially impact stormwater quality. The City will investigate adding information from the inventory to the GIS Stormwater Map.

## 2. HIGHER RISK FACILITIES

### (A) MULTI-AGENCY INSPECTION TEAM (MAIT'S) INSPECTIONS

This fiscal year, MAIT's inspected all City facilities on the list. The construction inspector assigned to the MAIT's inspection team assessed the potential of City owned and operated facilities to impact stormwater quality and prioritized municipally owned facilities based on the following criteria:

- Proximity to Lakeside Lake, an impaired water
- Need for an MSGP
- Potential for impacting stormwater quality based on:
  - Quantity (five gallons or more) and location of materials used and/or stored at the facility;
  - Potential for exposure to stormwater; and
  - Potential to discharge a substantial pollutant load to the MS4 or to a water of the U.S.

Eight City facilities that do not require coverage under a MSGP (but have separate special permitting requirements through ADEQ) were considered higher risk during this reporting period. These were: Thomas O. Price Service Center, Fred Enke, El Rio, Silverbell, and Randolph Golf Courses, Reid Park Zoo, Fire Department Maintenance (HAZMAT) and Household Hazardous Waste. Additionally, four City-owned facilities with MSGP coverage are also considered higher risk. The sites are listed below with their separate ADEQ permit number:

- Los Reales Landfill, (AZMSG-61695)
- Sun Tran Bus Terminal (AZMSG-61745)
- Sun Tran Bus Terminal Northwest (AZMSG-61747)
- Sun Van (AZMSG-61746)

Each facility is responsible to meet their special ADEQ permitting requirements and conditions.

### (B) PROPER MANAGEMENT OF USED OILS AND TOXICS

The Tucson Fire Department manages the City of Tucson Hazardous Waste Disposal Program, a citywide program to ensure proper handling and disposal of all toxic wastes generated by City operations.

The General Services portion of EGSD, located at Thomas O. Price Service Center, has an automotive fluids handling procedure to contain fluids in designated storage areas. During this reporting period, a Spill Prevention, Control, and Countermeasures Plan (SPCC) report for the Thomas O. Price Service Center was developed by a consulting firm and implemented to provide an updated spill prevention and containment protocol for facilities at the EGSD site at 4004 South Park Avenue. Stormwater Management is working with EGSD staff to create a training session for administrative and inspection staff to use the new SWPP and SPCC. As of January 2019, both on-site above ground fuel islands for both unleaded gas and diesel, at Jacobs Compound and Mission Manor Compound have been properly decommissioned and emptied.

(C) **CONTROLS FOR PESTICIDES, HERBICIDES, AND FERTILIZERS**

Responsibility for proper storage and application of pesticides, herbicides, and fertilizers at City owned facilities is shared by two City Departments, Parks and Recreation, and DTM, Streets and Traffic Maintenance Division. Multiple complaints continue to be received regarding the use of pesticides.

Several City departments continue to work on pilot projects, such as developing strategies to use organics, in order to limit and reduce the use of non-organic herbicides. During the FY 2018-2019, the City Mayor and Council assessed the safety aspects of pesticides used to determine their continued use and have adopted an organic approach to herbicide controls similar to Irvine County, California. The reduction in herbicide use is expected to benefit stormwater quality in the Tucson area. Parks and Recreation has oversight of the coordination of efforts related to pilot programs which includes landscape maintenance.

Proper storage practices in terms of current stormwater BMP's were verified during the Multi-Agency Inspection Team (MAIT's) inspections. Quantities of fertilizers, herbicides, and pesticides used by City staff is recorded and were provided by Parks and Recreation. Pesticide application licenses were also documented for staff and City contracted landscape companies. Licensed Pesticide Applicators are used to control vegetation at City Parks and Centers.

City staff continues to follow the prohibition against applying herbicides and pesticides in areas within or adjacent to washes and drainage features.

The following City parks have drainageways which are regularly maintained: Alvernon, Ft Lowell, Columbus, Estevan, Esquer, Kennedy, Oury, Swan, Mesa Village, Wilshire Heights, Tucson Public Safety Academy, Reid Park, Oaktree, TPD Hardesty Building, Riverview, Seminole, Vista Del Pueblo, Bristol, Rudy Garcia Park, Country Club Annex, Silverlake, and Parkview.

**C. Inspections**

**1. PRIORITIZING AREAS OF MS4 FOR INSPECTION**

DTM's Streets and Traffic Maintenance Division shared responsibility for inspection and maintenance of the City's MS4 drainage System with Parks and Recreation. The drainage system including streets, channels, and washes located within City owned parks are considered priority and are normally inspected once a year. The Parks Department continues to work on a series of maps that will show stormwater maintenance locations. These new stormwater maps are expected to increase inspection efficiency, and will be used as training tools for inspections. Based on system history, citizen complaints, and known maintenance concerns, the City annually inspects key areas of the stormdrain system located outside of City owned parks for the presence of illicit discharges, excess sediment, litter, debris or other pollutants that may obstruct flow or be transported in stormwater. In this report period, the

City considered 383 miles of the MS4 drainage system outside of City-owned parks as priority and 350 miles of these were inspected.



## 2. REGIONAL WATERCOURSES

Pima County Regional Flood Control District (RFCD) assessed the regional watercourses in the Tucson area for sediment issues, and managed a drainage maintenance program to address aggradation within portions of the county - maintained regional watercourses. Some portions of the regional watercourses (Rillito and Santa Cruz River) were dredged, and vegetation removed, to assure containment of jurisdictional flood within the channel as a safety project. Photo at left: portion of the Rillito upstream of Santa Cruz River where part of the riverbed has been graded by RFCD with

remaining riverbed left with existing vegetation, to improve floodwater conveyance within the watercourse to reduce flood risk to adjacent property owners.

In addition, Stormwater Inspection staff inspected 33 miles of drainage systems.

## 3. MUNICIPAL FACILITY ASSESSMENTS

The City's Multi-Agency Inspection Team (MAIT's) discontinued conducting annual inspections of over 200 City-owned and operated facilities due to COVID-19. During the last fiscal year, DTM Stormwater Management requested a list of the facilities and addresses from The Safety Group so that DTM Stormwater Management staff could determine which facilities would need exterior stormwater inspections. The list, once obtained, will provide the City facilities that will continue to have annual stormwater inspections performed to determine if five or more gallons of potential stormwater pollutants were stored in areas exposed to stormwater, secondary containment was provided as needed, and if the site met other environmental (stormwater) criteria. The City intends to assess municipal properties annually to reduce or eliminate discharges from city owned/operated facilities through using best management practices (BMP's) that protect stormwater quality. In order to comply with these requirements, these facilities will be inspected to ensure materials are not being stored in a manner that will allow pollutants to enter the stormwater drainage system, which including streets, washes, catch basins, gullies, arroyos, etc. Based on these assessments, on the types of activities performed, material stored, and proximity to receiving waters, the City determined which of these facilities are considered high risk. City Floodplain Administration is also looking at opportunities to have floodplain hazard inspections added to these assessments to increase resiliency against flood and erosion hazards per the updated and adopted 2020 Floodplain Management Plan.

EGSD owns and maintains 15 closed landfills and one active landfill; Los Reales. Los Reales Landfill operates under the MSGP 2010 (AZMSG-61695). The Los Reales Landfill SWPPP was written in accordance with the MSGP 2010. Los Reales Landfill staff conducts monthly routine inspections and additional inspections during measurable storm events; a total of 14 routine inspections were conducted. During this reporting period, Los Reales Landfill staff conducted an annual comprehensive inspection of the Los Reales Landfill. This inspection

is an additional measure to ensure that pollutants are controlled. No violations or concerns were noted during the inspection. Los Reales Landfill is maintained in good operating condition.

EGSD conducted quarterly inspections of the closed regulated landfills and annual inspections of closed non-regulated landfills. An additional 29 weather related inspections were performed on closed landfills with engineered caps. Stormwater staff conducted inspections of the 15 closed landfills during this reporting period. The closed landfills are maintained in good condition. No concerns or violations were noted.

The City's fleet operation and maintenance facility, Thomas O. Price Service Center (TOPSC), is not regulated under an MSGP. However, it is covered under the City's MS4 permit. The TOPSC maintains a SWPPP and had a Stormwater Pollution Prevention Team that conducted quarterly stormwater inspections of the facility. A new, updated SPCC was used during this reporting period. DTM conducted an inspection of the TOPSC during this reporting period. This inspection included inspection of the new compressed natural gas (CNG) plant and vehicle CNG fueling area.

#### **4. MSGP FACILITIES**

To date, the only city-owned and operated facility that qualifies for coverage under the Multi-Sector General Permit is Los Reales Landfill. Los Reales is covered under authorization number AZMSG-61695, and is inspected quarterly by the EGSD, however, as an additional landfill control measure, Los Reales is inspected annually by the Stormwater Management Program. On May 20, 2020, the Los Reales Landfill was inspected as part of these FY 2020-2021 oversight inspections. The active landfill was inspected for the following locations: tire washing station, new cell construction, perimeter road systems, trash capture systems, eastern stockpiling area (separate from east detention basin), recycling center, and household waste areas (for secondary containment proper storage of chemicals).

There are three City owned transit facilities that are privately managed and staffed. These are the two Sun Tran Bus Maintenance Facilities and the Sun Van Facility. All three are operated under separate MSGP 2010 permits. These facilities were inspected during this reporting period. Minor housekeeping issues were identified during inspections and were immediately addressed. The MSGP permit numbers for these facilities are listed below.

- Sun Tran Bus Terminal AZMSG-61745
- Sun Tran Bus Terminal Northwest AZMSG-61747
- Sun Van AZMSG-61746

#### **5. SUMMARY OF FOLLOW-UPS**

During FY 2020-2021's inspections of municipally owned and operated facilities noted some concerns. The concerns were for the following deficiencies:

- The Northwest Sun Tran facility detention basin continues to need basin bottom re-engineering to address ponding issues.
- At same facility, areas were identified for soil removal and disposal.
- Onsite General Housekeeping Training and Spill Response Training was requested by Stormwater Management staff and is being scheduled.

During the City facility inspections, minor adjustments to good housekeeping practices were recommended and usually addressed during the inspection. All inspections included a representative of the facility to observe any deficiency. Reports were sent to the facility managers and the responsible party. The report described the deficiencies and included instructions to notify the MAIT's team, within 30 days of the corrective action, or to provide an abatement schedule. Follow-up inspections were conducted and all deficiencies were corrected.

## **D. Infrastructure Maintenance**

### **1. STORMDRAIN SYSTEM**

- Miles visually inspected:  
City Street and Traffic Maintenance Inspectors inspected 350 miles of drainage channels/washes. Stormwater Inspectors inspected an additional 33 miles of stormdrain /washes. In total, approximately 383 linear miles of the City's MS4 were inspected.
- Miles Cleaned or Debris Removed:  
In this report period, approximately 108 miles of drainage channels outside City parks were cleaned. Drainage channels within City parks are monitored by regular site inspections.
- Cleaning of Closed Conduit:  
Contracted vector services are utilized whenever there is need to clean City-owned closed conduit facilities. During this reporting period, 5 sites of closed conduit were cleaned. The section of the High School Wash box culvert adjacent to TUSD sport field near 3<sup>rd</sup> Ave and 8<sup>th</sup> Street is scheduled to be cleaned spring 2022. Homeless protocol is implemented in each case, where notification to Homeless people was posted at least 72 hours prior to removal of encampment, unless flood safety issue exists. COVID-19 eviction moratorium was determined to not apply for any drainageways or other floodprone or erosion hazard area within the City's stormdrain system. For this reporting period, \$6,240 was spent by DTM for vector services within the closed conduit system (box culvert systems).
- Retention/Detention Basins Cleaned:  
Accumulated sediments and debris in retention/detention basins are removed seasonally, or as necessary, contingent on flow. Streets division assists Parks & Recreation Department with cleaning flood control features such as retention/detention basins and dams located in City owned Parks.
- Number of Catch Basins Identified to date:  
The City has identified 1,168 catch basins.
- Number of Catch Basins Cleaned:  
1,168 grates and catch basins were cleaned by the Streets and Traffic Maintenance Department.

## 2. ROADWAY SYSTEM

- Street and Parking Lot Sweeping Program:  
The Streets and Traffic Maintenance Division's current schedule for street sweeping for major arterial and collector streets is twice monthly, and sweeping streets in the central business district is three times each week. These priorities are reassessed annually. Street and parking lot sweeping in public parks is also conducted through the Parks & Recreation Department.
- Broom Miles:  
During this reporting period, the Streets and Traffic Maintenance Division swept 19,121 broom miles of roadways. The Parks & Recreation Department performed sweeping on 46 broom miles of parking lots and roadways within City owned Parks for FY 2020-2021.
- Total Waste Collected:  
The total amount of waste collected from Streets and Traffic Maintenance Division sweeping efforts was 11,016 tons, which was over a 41% increase from last fiscal year.

### E. Mapping Status

The City's GIS mapping system (MapTucson) is formatted as an Environmental Systems Research Institute (ESRI) Geodatabase feature class with North America Datum of 1983 (NAD83) High Accuracy Reference Network (HARN) in State Plane Arizona Central Federal Information Processing Standard (FIPS Code 0202). The vertical datum is the North American Vertical Datum of 1988 (NAVD88) in International Feet. The GIS based Stormwater Map, <https://maps.tucsonaz.gov/maptucson/> currently contains the following information:

- Linear Drainage Structures: Line layer showing the location of stormwater system pipes. The direction of flow can be determined based on the topographic layer.
- Stormdrain Grates and Catch Basins: Point layer showing the locations of stormdrain grates and catch basins.
- Outfalls: Point layer showing the location of all major outfalls (field screen locations); polygon layer showing the drainage area associated with each of the five sampling sites where stormwater is monitored.
- Maintenance responsibility: Data is being updated to depict maintenance responsibility of drainage features, and may include responsibility by private, federal, railroad, school, PCRFC, city, or state agency.
- Detention/Retention Basins: Point or polygon layer showing the locations of all identified City-owned retention and detention basins.
- Jurisdictional Boundary: Line or polygon layer showing the jurisdictional boundaries of the MS4, including any new land annexations during the permit term.
- A new inventory was created by Streets Administrative staff and Inspectors to catalogue grated inlets.
- Record drawing (as-built) data is continuously transferred by DTM staff to the MapTucson GIS map.

The City anticipates that the North American Datum of 1983 (NAD83) may be replaced by a new geometric datum which provides latitude, longitude, height, and time. The North

American Vertical Datum of 1988 (NAVD88) could be replaced with a new vertical ('geopotential' / geoid model of the earth) datum, based on CORS (Continuously Operating Reference Station) and airborne GRAV-D data. Planning has begun to prepare for this upcoming change that will affect City stormwater and floodplain management, but ultimately the City hopes that the new datum will provide more accuracy for mapping stormdrain and floodplain systems. [Reference: National Geodetic Survey [geodesy.noaa.gov](http://geodesy.noaa.gov)]

## V. Industrial Stormwater Program

### A. Municipal Employee Training

The Stormwater Management Program Manager and engineering staff with assistance from part-time Stormwater Management staff have been training two new Inspectors who joined the team in late summer 2019. Inspectors are continuing training for facility inspections, sampling site activities, IDDE inspections. These two new Stormwater Management Inspectors met monthly with Program Manager and weekly with engineering division staff to discuss stormwater activities and to review developed procedures. Stormwater Management Team is currently in need of a Lead Inspector to provide oversight of field programs and assist with annual reporting.

### B. Status of Inventory

#### 1. INDUSTRIAL FACILITY DATABASE

DTM maintains a list of Industrial and Commercial facilities that have the potential to discharge pollutants to the City's storm sewer system. Currently the list consists of 230 facilities that are targeted by the Multi-Sector General Permit (MSGP). The Industrial Facility list currently includes the following facilities:

- Industrial facilities identified in 40 CFR 122.26(d)(2)(iv)(C);
- Industrial facilities subject to MSGP requirements, including those facilities that have submitted for a no exposure exclusion; and
- Other industrial and commercial sources (or categories of sources) that the City has inspected over the last permit term.

#### 2. HIGHER RISK INDUSTRIAL FACILITIES

During the previous reporting period, the Stormwater Management Program identified 41 higher risk industrial facilities that are more likely to be sources of stormwater pollution. The priority list was re-evaluated and risk assessment was based on the type of facility, the products or services provided by the facility, proximity to receiving waters, receiving water quality, and other factors that indicate the potential to impact water quality. The City provides specific inspections and outreach letters to each of the industrial facilities inspected. The City provides guidance on correct stormwater issues at each site and lists corrective actions. The Stormwater Inspectors provide additional follow-up when warranted.

#### 3. AZPDES NON-FILERS

The City continued with the program to determine whether or not a facility has obtained coverage under the Arizona Multi-Sector General Permit. When the City identifies a facility

that has not obtained the required coverage, the City will report that facility's location and information to the ADEQ Unit Manager, Field Services Unit, Water Quality Compliance Section semi-annually, by June 30 or December 31. During this reporting period, there were four businesses that were assisted in obtaining the proper documentation from the State without having to report them as non-filers.

## C. Inspections

### 1. INSPECTION FINDINGS

During the facility inspections, recommendations were made to improve control measures to assure permit compliance. Some sites were no longer in business or at the address, and some were inactive due to COVID-19. There were no enforcement actions that involved City court. All corrective actions were minor and corrected at the time of inspection or, if needed, were corrected by the time of a scheduled re-inspection. Notable corrections made at inspected facilities included the following:

- Obtain required MSGP.
- Create or update facilities SWPPP.
- Update SPCC plans every 5 years.
- Train employees on stormwater pollution prevention and spill response.
- Install control measures to prevent discharges into the MS4.
- Place secure lids on 55-gallon drums and relocate drums to areas with overhead protection and secondary containment.
- Reduce inventory of 55-gallon drums used for waste.
- Improve housekeeping at fueling areas by cleaning spills with absorbents and having spill kits stationed at fueling areas.
- Improve control measures / BMP's at material storage areas to prevent discharges into MS4.
- Improve general housekeeping by cleaning spills promptly, training employees, and having spill kits available at work areas.

### 2. INSPECT 20% OF ALL FACILITIES

The City continued to include photographs and summaries in the inspection reports. These details ensure that the owner and operator clearly understand what recommendations need to be applied. During this reporting period, the City focused industrial inspection efforts on a variety of exposure facilities. While continuing to inspect the low-risk, medium-risk and high-risk facilities, the City continues to include a portion of the non-exposure (low-risk) facility inspections per previous EPA audit which identified the need to inspect these low-risk, non-exposure facilities. A total of 4 low-risk facilities were inspected of the total 120 low-risk facilities on the City's list. Of the 35 high risk facilities, 5 were inspected. There were also 10 medium-risk facilities inspected out of the total 34 medium risk facilities for FY 2020-2021. Of these, several were identified as having materials exposed to stormwater. Facility operators were advised to either move potential stormwater pollutants under cover or apply for MSGP coverage.

This year, the target of inspecting at least 20% of all industrial and commercial facilities on the City's list was achieved for the medium-risk facilities, with 29% of all the medium-risk facilities inspected, however only 3% of low-risk and 14% of high-risk facilities were inspected. The City inspected 19 facilities. This total is 10% of all of the facilities identified as having the potential to discharge pollutants to the City's storm drain system. The City will continue to review and revise the facility list, and will ensure that a minimum number of facilities per new MS4 permit receive inspections. For the next year (2021-2022) low-risk, medium-risk and high-risk non-exposure facilities will be inspected.

### 3. ENHANCING THE INDUSTRIAL FACILITY PROGRAM

During the permit term with the challenges from COVID-19, City took all precautions to assure safe inspection protocols for the commercial / industrial inspections. However there were facilities that preferred not to have onsite meetings due to COVID-19 and due to little to no business activity at the commercial / industrial facility. Where inspections did occur, DTM enhanced the industrial/commercial program by continuing to educate facility operators regarding the MSGP and the sector specific requirements for their respective industry. During facility inspections, additional time was dedicated to discuss and explain the MSGP and sector specific requirements. This outreach was performed to assist facility operators in complying with stormwater regulations.

## VI. Construction Site Controls

### A. Municipal Employee Training

#### 1. NEW & EXISTING EMPLOYEE TRAINING - DEPARTMENT OF TRANSPORTATION & MOBILITY

The Stormwater Management Program continued to seek training opportunities during this reporting period for the new inspection staff who started Summer 2019. The new Stormwater Inspectors received extensive training during their first year. Stormwater training incorporates both SWPPP review and inspections. An emphasis on cross training allows a small staff to fill in as needed to meet fluctuations in workload. They receive extensive written materials, such as, a copy of the Stormwater Ordinance (SWORD), the Stormwater Management Plan, the Watercourse Maintenance Guidelines, a copy of the 2020 AZPDES Construction General Permit, and any applicable ordinances and regulations and outreach materials for stormwater management for construction facilities.

#### 2. NEW & EXISTING EMPLOYEE TRAINING - PLANNING & DEVELOPMENT SERVICES DEPARTMENT

During this reporting period, PDSD held 26 small training sessions for their 2 member SWPPP review staff.

### B. Planning and Land Development

The City recognizes the need to understand Low Impact Development (LID) and Green Infrastructure Practices (GI). The City is considering updating the "Green Streets Active Practice Guidelines" for City streets construction projects. DTM Stormwater Management is working with PDSD to change the review for student housing projects to assure IDDE

issues are avoided with design considerations identified by issues that have occurred in the past.

## **C. Plan Review and Approval**

### **1. PLAN REVIEW**

Following SWPPP review and plan approval, PDSO issues grading and building permits. The follows adopted 2018 International Building Code with local amendments including grading, drainage, slope and terracing requirements, as well as the grading requirements in the City's Technical Standards Manual section 2-01, adopted on October 9, 2012 (previously Development Standards Section 11). PDSO requires a copy of the SWPPP plan review. PDSO also looks for authorization number / NOI at the grading sites, as well as performs follow-up compliance inspections for SWPPP corrections. Depending on forecasted rain events and also after storm events, PDSO inspectors perform spot inspections of grading sites for SWPPP compliance. DTM Stormwater Management works closely with PDSO Inspectors when there are SWPPP issues for development sites impacting stormdrain systems or public right-of-way.

### **2. PLAN APPROVAL**

The SWPPP and Notice of Intent to Discharge (NOI) must be completed prior to commencement of ground disturbing activities over an acre in size. SWPPPs were submitted and reviewed and ground disturbing permits were issued that met the AZPDES Construction General Permit eligibility requirements. See SWMP for SWPPP review procedures.

### **3. PRE-CONSTRUCTION MEETINGS**

PDSO held 51 pre-construction meetings for private construction projects. The meetings provided an opportunity to review the City's requirements that included providing a copy of ADEQ's authorization document at the preconstruction meeting and discuss implementation of SWPP BMP's. Other requirements are aimed at ensuring the contractor understood that the stormwater controls (BMP's) to be utilized for all sites regardless of the size, if pollutants potentially leave the site.

### **4. DEPARTMENT OF TRANSPORTATION & MOBILITY CAPITAL IMPROVEMENT PROJECTS**

DTM administers the construction of roads and stormdrain within the publicly owned rights-of-way. DTM Stormwater Management staff, located in Engineering Review Division, reviews plans and ensures the SWPPPs for these projects meet all the requirements of the Arizona Construction General Permit. The City does not issue a Notice to Proceed until a copy of ADEQ's authorization document is received. Copies of the Notice of Termination and Stormwater inspection reports performed by DTM Inspectors are provided by the Project Managers to the Stormwater Management staff.

## **D. Status of Inventory**

### **1. PERMITS PLUS DATABASE**

The City continued to utilize the Permits Plus Database to track private development activities and inspections, and has recently started to add transportation capital improvement projects to the

database. PIA plans are already utilizing the Permits Plus Database System. Information in the database included: requirements for a Construction General Permit, plan and SWPPP review comments, number of submittals, site location, construction inspections, enforcements and other information. This database is continually updated as plans are submitted and reviewed, permits are issued, and construction sites are inspected. DTM is moving to a new database (OMS & Cartegraph) and software system (ENERGOV) that is expected to go live in next reporting period.

## **E. Inspections**

Many construction projects are small and do not meet the disturbance limit under the AZPDES Construction General Permit. Capital projects undertaken by the City that do not require AZPDES coverage are still required to utilize good housekeeping measures and use BMP's. These projects are also inspected for compliance with the projects' Special Provisions document, where the City has this special higher standard requirement.

ROW permits for excavation, private improvements, or other earth disturbing work that do not require a SWPPP are inspected for good housekeeping measures as well.

### **1. INSPECTION FINDINGS**

During this reporting period, PDSD inspected 155 construction sites. The findings were typical of construction sites and inspectors communicated what was needed in order to comply with AZPDES construction general permit.

### **2. ENFORCEMENT ACTIONS**

During this reporting period, PDSD issued 265 enforcement requests for corrective actions due to site deficiencies. These included the location, installation, and maintenance of controls, and the requirement for on-going inspections. All 265 enforcement actions were resolved at the time of the follow-up inspection.

### **3. DEPARTMENT OF TRANSPORTATION & MOBILITY PROJECTS**

During this reporting period 57 inspections of 3 Capital Improvement Projects (CIP) and 3 Public Improvement Agreement (PIA) projects involving road construction were performed. SWPPP deficiency(s) were reported to the on-site superintendent, field engineer, or designated representative. Verbal warnings were given to correct the discovered deficiency(s) that ranged from track-out, sediment accumulation along the roadway, stormdrain inlet protection maintenance, improperly installed BMP's, failed BMP's, stockpile management, concrete washout use, and record keeping. Follow-up inspections determined that all concerns were quickly addressed and resolved satisfactorily.

## **VII. Post-Construction Site Controls**

### **A. Municipal Employee Training**

Municipal employee training for construction and post-construction is discussed under Section VI Construction Site Controls.

## **B. Post-Construction Controls**

In this reporting period, the City is developing post-construction control methods for municipal projects, by working with City-owned facility management to assure storm drainage systems are being maintained. Privately developed and owned retention/detention basins were inspected by PDSD Grading and Drainage Inspectors.

### **1. INSPECTION OF PRIVATELY OWNED RETENTION/DETENTION BASINS**

PDSD has an on-going program for inspection of privately owned retention/detention basins to ensure that the basins continue to operate as designed. This fiscal year, PDSD inspected 1,350 privately owned basins and performed follow up inspections if deficiencies were found. PDSD program is being updated with assistance by Stormwater Management.

### **2. INSPECTION OF 75% OF CITY PERMITTED SITES**

In this report period, the City inspected all of the permitted sites. PDSD inspectors conducted 2,650 post construction inspections of privately developed sites to ensure vegetative landscape cover was established to stabilize the site, that permanent installed stormwater controls were functioning properly and are being maintained. The Stormwater Management Program conducted post-construction inspections for Capital Improvement Projects and Private Improvement Agreement projects that were completed during this report period. Permits and Codes Section performed post-construction inspections for AZPDES permitted projects conducted within the private right-of-way. Concerns or deficiencies were addressed.

## **C. Compliance Activities/Enforcement**

### **1. PRIVATELY OWNED RETENTION/DETENTION BASINS ENFORCEMENT**

No major enforcement actions (citations) were issued in this report period. However, verbal and/or written requests for basin maintenance are still given. Property owners for basins that have “poor” condition results are contacted for corrective action. With the new stormwater software, digital inspection forms are being developed so that at time of inspection, letters will be automatically generated as needed. During the FY 2020-2021, DTM Stormwater Management is working with PDSD staff to develop the boiler-plate letters for the new SAMS software. Letters will be generated based on input into the SAMS Stormwater software during inspections by the PDSD Inspectors. Besides being inspected by PDSD Inspectors annually, these detention/retention systems are also privately maintained, with required annual inspections and assessment for maintenance by a private Civil Engineer hired by the subdivision’s homeowners’ association or commercial development owner’s property management, per City regulations. These annual inspection reports are to be made available to the City upon request. In this reporting period, there was one non-compliant dry well at a commercial business. Dry wells that do not follow all 17 regulatory criteria are considered non-compliant (criteria from requirements in the detention/retention manual and City’s Drainage Manual).

### **2. SUMMARY OF FOLLOW-UP ACTIONS**

Upon follow-up, all requested maintenance had been performed to keep basins functional.

## PART 4: NUMERIC SUMMARY OF STORMWATER PROGRAM ACTIVITIES

### I. Table I: Stormwater Public Education and Outreach FY 2020-21

City of Tucson Department of Transportation & Mobility		
Target Group:	General Public	
	Outreach Materials	Number
	<ul style="list-style-type: none"> <li>• Water Harvesting Guidance Manual</li> </ul>	2
	<ul style="list-style-type: none"> <li>• Swimming Pool Discharge Flyer</li> </ul>	26
	<ul style="list-style-type: none"> <li>• Yard and Landscape Waste Disposal brochure</li> </ul>	12
	<ul style="list-style-type: none"> <li>• Leaky vehicle flyer</li> </ul>	12
	<ul style="list-style-type: none"> <li>• Promotional materials given away at Public Outreach Events                             <ul style="list-style-type: none"> <li>○ July 13, 2019 - Ward IV Back to School Bash</li> <li>○ September 17, 2019 - Tucson Association of Realtors EXPO</li> <li>○ February 22, 2020 - E-Week Park Mall Event</li> <li>○ April, 2020 - Earth Day - Children's Museum (no event due to COVID-19)</li> <li>○ May, 2020 - 2020 EHSS Vendor Fair - Raytheon (no event due to COVID-19)</li> <li>○ June 15, 2020 - Monsoon Safety Awareness Week (no event due to COVID-19)</li> <li>○ Nov 21, 2020 - Family Festival in the Park (no event due to COVID-19)</li> </ul> </li> </ul>	0
Target Group:	General Public	
	Outreach Materials	Number
	<ul style="list-style-type: none"> <li>• <i>Desert Wash Safety Activity Book</i> for grade school children                             <ul style="list-style-type: none"> <li>○ Stormwater runoff issues and residential stormwater BMP's</li> <li>○ Illicit discharges and illegal dumping</li> </ul> </li> </ul>	0
	<ul style="list-style-type: none"> <li>• <i>Stormwater in the Desert</i> book for middle school children and interactive website                             <ul style="list-style-type: none"> <li>○ Stormwater runoff issues and residential stormwater management practices</li> <li>○ Stormwater quality impacts from application of pesticides, herbicides and fertilizer</li> <li>○ Potential impacts of animal waste on stormwater quality</li> <li>○ Preventing Illicit discharges and illegal dumping</li> <li>○ Spill prevention, proper handling and disposal of toxic and hazardous materials</li> </ul> </li> </ul>	0
Target Group:	Construction Site Operators, Development Community	
	Outreach Materials	Number
	<ul style="list-style-type: none"> <li>• Construction information packets                             <ul style="list-style-type: none"> <li>○ Ordinances, design standards for stormwater in new developments/redevelopments</li> <li>○ Municipal stormwater requirements and BMP's for construction sites</li> <li>○ Illicit discharges and proper management of non-storm discharges</li> <li>○ Spill prevention, and BMP's to contain and minimize discharges</li> <li>○ Proper management and disposal of used oil and hazardous/toxic materials,</li> <li>○ BMP's to minimize exposure of materials/wastes to rainfall</li> <li>○ Stormwater pollution prevention plans, and facility maintenance procedures</li> </ul> </li> </ul>	51
Target Group:	Industrial Commercial Businesses	
	Outreach Materials	Number
	<ul style="list-style-type: none"> <li>• Industrial Information packets                             <ul style="list-style-type: none"> <li>○ Illicit discharges and proper management of non-stormwater discharges</li> <li>○ Spill prevention, proper handling of toxic and hazardous materials</li> <li>○ Proper management and disposal of used oil and hazardous materials, including practices to minimize exposure of materials/wastes to rainfall</li> <li>○ Stormwater pollution prevention plans, and facility maintenance procedures.</li> </ul> </li> </ul>	19
	Subtotal Reached	122
	Costs	\$25

City of Tucson - Planning and Development Services		
Target Group:	Development Construction	
	Outreach Materials	Number
	<ul style="list-style-type: none"> <li>12 Monthly Outreach meetings, approximately 15 attendees</li> </ul>	15
	Subtotal Reached:	15
	Cost:	\$1,200
City of Tucson Environmental Services Household Hazardous Waste (HHW)		
Target Group:	General Public	
	Outreach Materials	
	<ul style="list-style-type: none"> <li>Bill inserts for disposal of auto fluids, batteries, paints, solvents, pool chemicals, and pesticides and schedule of collection events</li> <li>HHW webpage visits</li> <li>News Releases on HHW collections</li> </ul>	14,000 49,502 12
	Subtotal Reached	63,636
	Costs	\$7,000
Tucson Water		
Target Group:	General Public	
	Outreach Materials	Number
	<ul style="list-style-type: none"> <li>Rainwater Harvesting Brochures printed in FY 2020-21, 0 regular program, 0 low income program</li> <li>Rack cards to advertise both rebate and grant/loan programs</li> <li>Student activity booklets including Rainwater Harvesting components distributed in FY2020-21</li> <li>Pima County Flood Control bill insert regarding stormwater pollution prevention (distributed with City of Tucson Utility Services statement)</li> </ul>	0 650 18,355 220,000
Target Group:	Homeowners	
	<ul style="list-style-type: none"> <li>Rainwater Harvesting Workshop attendees in FY 2020-21</li> <li>Rebate for Rainwater Harvesting systems in FY 2020-21</li> <li>All attendees receive: Tank Zoning and Permit Requirements for the City of Tucson, Rainwater Harvesting Incentives Rebate Program Most Requested Information, Pima County Development Services SOP 250.4 Permitting Requirements for Water Tanks, Eight Principles of Successful Water Harvesting, Rainwater Harvesting Best Management Practices for Installation, Rainwater Harvesting for Drylands Appendix 4, Alternative Water Sources and Backflow Assembly Requirements Brochure, Tucson Water Rainwater Harvesting Guidebook</li> <li>Grants and loans for Low-Income Rainwater Harvesting systems in FY 2020-21</li> <li>Neighborhood Stormwater Harvesting Program: 5 completed green infrastructure projects in FY 2020-21</li> </ul>	910 371 \$511,270  11 \$361,099
	Subtotal Reached:	240,297
	Cost:	\$880,594
Tucson Clean and Beautiful		
Target Group:	General Public	
	GSI/Stormwater Outreach Participation	Number
	<ul style="list-style-type: none"> <li>Green stormwater infrastructure outreach to the public through presentations and workshops (424 Participants stormwater workshops of presentations with 528 volunteer hours)</li> </ul>	424
	Subtotal Reached	424
	528 In-Kind Volunteer Hours for Participants Cost:	\$13,200
Pima Association of Governments		

Target Group:	Professional Audience	
	Outreach Materials	Number
	<ul style="list-style-type: none"> <li>Emails to WPS and EPAC listservs (208 Plan, WOTUS, HHW topics)</li> <li>Emails to PAG's stormwater listservs (SWMWG, MS4s)</li> </ul>	2,800 326
Target Group:	General Public	
	Outreach Materials	Number
	<ul style="list-style-type: none"> <li>Stormwater-related posts on PAG social media (Facebook, Twitter, Instagram)</li> <li>PAG Stormwater and Green Infrastructure web page</li> <li>PAG Green Infrastructure Prioritization Tool (online interactive map)</li> <li>WPS and EPAC meetings (4 meetings)</li> </ul>	2,682 663 2,554 213
	Subtotal Reached:	9,238

### Summary of Public Education and Outreach

Jurisdiction	Reached	Costs
City of Tucson Department of Transportation & Mobility		\$0
City of Tucson Planning and Development Services Department		\$0
City of Tucson Environmental Services Household Hazardous Waste (Bill insert printing costs)	189,502	\$7,000
City of Tucson Water Department	906	\$880,594
Pima Association of Governments / TCB		\$13,200
TOTALS:		\$893,794

## II. Stormwater Public Involvement FY 2020-21

Stormwater Management Program		
Participants:	General Public	
	Activity	Number
	<ul style="list-style-type: none"> <li>Stormwater Section website hits</li> </ul>	4,080
	Subtotal Reached:	
Parks & Recreation Program		
Participants:	General Public	
	Activity	Number
	<ul style="list-style-type: none"> <li>Pet waste stations at the Parks 4 at Miles Elm, 2 at Armory Park, 1 at Harriet Johnson Park</li> </ul>	7
City of Tucson Environmental Services Household Hazardous Waste (HHW)		
Participants:	General Public	
	Activity	
	<ul style="list-style-type: none"> <li>Household Hazardous Waste Collection Program</li> <li>Participants in the program (total)</li> <li>HHW-LR drop-off site</li> <li>Participants in the program (Counted in HHW Collection Program above)</li> <li>Home Pick-up <ul style="list-style-type: none"> <li>Participants in the program (counted in the HHW Collection Program above)</li> </ul> </li> <li>Outreach Events</li> <li>Participants in the program (counted in the HHW Collection Program above)</li> </ul>	7,383 4,370 0 2,895
Participants:	Small Businesses	14,648
	Activity	
	<ul style="list-style-type: none"> <li>Small Business Waste Assistance Program</li> <li>Participants in the program</li> </ul>	58 58

	Subtotal Participants:	14,764
	Subtotal Program Cost:	\$0
<b>Tucson Clean and Beautiful</b>		
Participants:	General Public	
	Activities	Number
	• Number of trees planted in or distributed to the community	6,023
	• 1,671 volunteers participating in tree planting activities (total volunteer hours)	3,340
	• 3,440 volunteers participating in clean-ups in public areas (including streets and Washes (total volunteer hours)	7,638
	• In-Kind Value for Volunteer Hours from Participants	\$274,450
	• In-kind Value for trees planted \$35/each	\$210,805
	Subtotal Program Cost:	\$ 485,255

**TABLE II. SUMMARY OF PUBLIC INVOLVEMENT**

Jurisdiction	Reached	Costs
City of Tucson Department of Transportation & Mobility Stormwater		\$0
City of Tucson - Household Hazardous Waste		\$0
Tucson Clean and Beautiful		\$485,255
<b>TOTALS:</b>		<b>\$485,255</b>

### III. Illicit Discharge Detection & Elimination Program

#### A. Municipal Employee Training

The City's Stormwater permit requires training of field staff and stormwater inspectors on detecting, investigating and identifying illicit discharges (non-storm flows that may contain pollutants). New employees shall receive training within the first year. Existing employees shall receive refresher training every two years.

Parks and Recreation Training included TSG Spill Response and Spill Management online training module.

Training sessions were provided by Stormwater Management in limited training venues (in-person field meetings or by phone) to stormwater staff from various departments including the Code Enforcement staff of EGSD in FY 2020-2021. A total of 14 Code Enforcement Inspectors had been previously trained to inspect the area downstream of the University of Arizona campus just upstream of the West University Neighbourhood. These Code Enforcement staff were delegated IDDE inspections and responsibilities by the City Manager to assist with complaints of discharges from the high-rise buildings being built in this area since 2014. During this reporting period, the DTM stormwater management Inspector met with the EGSD Inspector in the field for training to go over IDDE aspects of inspections for stormwater quality including checking to see that dumpsters lids are closed, area around dumpsters are clean, no discoloured discharges are coming from scuppers or other locations downstream of these sites, that hose washing by property management is directing runoff to sanitary clean-outs, that non-rain event discharges are checked.

Multiple department efforts continue including follow-up from last year's meetings with Tucson Water to address waste of resources (water); Department of Transportation & Mobility for Stormwater Management guidance, code reference, sampling, and inspection; EGSD Code Enforcement (to assist with any needed notice of violation and to perform inspections in private development areas of high number of complaints); and PDSD. The Building Official at PDSD assists with directing review staff to check for stormwater quality aspects that have been frequently found at sites for non-compliance. Stormwater Quality related review would emphasize reviewing new development for proper connections to comply for discharging system for air-conditioning environmental control units, plumbing connections for jacuzzis, accommodations in the below roof / below ground parking areas for solid waste pick-up dumpsters (so that any nearby runoff is directed to sanitary system), and reviewing external proposed locations for solid waste pick-

up to assure ground surface grades direct localized stormwater runoff away from or around the dumpster area (not through the pad where the dumpster sits). Departments continue to work toward achieving development that protects stormwater quality, and Stormwater Management staff will continue to learn from plumbing review staff and help train reviewers.

Stormwater Management works with DTM Streets Division and EGSD to prepare training sessions for field staff. PowerPoints are being developed to provide facility-specific stormwater quality inspection procedures, SWPPP implementation, good housekeeping, and best management practices. Online trainings occurred for 2020-2021 for 20 New Hires using Microsoft TEAMS and The Safety Group had 4 Monthly Tailgates for 76 current staff.

1. Provide the number of new employees (if no new employees, indicate none) 20

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2016-17	2017-18	2018-19	2019-20	2020-21
Number of training sessions					
Identifying and reporting non-stormwater discharges that may contain pollutants	30	52	52	48	• 5
Number of employees attending training	• 9	• 4	35	7	• 96

### B. Spill Prevention for municipal facilities

The City's Stormwater permit requires certain municipal facilities to have site specific materials handling and spill response procedures. The affected facilities include all those where used oil or other toxic or hazardous materials are used, stored or handled, where any single container exceeds 5 gallons, and where such materials are exposed or have the potential to be exposed to stormwater.

- These facilities shall be inspected/assessed at least annually to ensure that the procedures are in place and effective.
- Copies of the site-specific materials handling and spill response procedures shall be available at all municipal facilities.
- The site-specific materials handling and spill response procedures shall be reviewed every 2 years and the review shall include the participation of personnel with stormwater expertise.

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2016-17	2017-18	2018-19	2019-20	2020-21
Number of municipal facilities that require site specific materials handling and Spill response procedures	• 9	• 9	• 9	• 9	• 9
Environmental Services (HHW, HHW-LR, HHW Remote Collections)	• 3	• 4	• 2	• 4	• 8
Fire (HAZWaste at fire stations)(HAZWaste at Yard)	• 1	• 1	• 1	• 1	• 1
General Services (Service Stations)	• 9	•	• 8	• 8	• 6
Parks & Recreation	• 3	• 9	• 1	• 1	• 1
DTM - Streets & Traffic (storage yard)	• 2	• 2	• 2	• 2	• 2
Water (well sites)	• 185	• 173	• 163	• 150	• 160
Number of spills at municipal facilities with hazardous					

<b>materials that occurred in outside areas</b>					
Environmental Services(Los Reales Landfill, HHW, HHW Remote Collections/ Garbage Truck Leaks)	• 0/597	• 0/576	• 0,0,0/252	• 0,0,0/225	• 0,0,0/397
Fire	• 0	• 0	• 0	• 0	• 0
General Services	• 0	• 0	• 0	• 1	• 0
Parks & Recreation	• 0	• 2	• 1	• 0	• 0
DTM - Streets & Traffic	• 0	• 0	• 0	• 0	• 0
Tucson Water	• 0	• 0	• 0	• 0	• 0
<b>Number of inspections or assessments of these facilities completed</b>					
Environmental Services(Los Reales Landfill, HHW / Closed Landfill Inspections)	• 26/50	• 26/33	• 18,12/17	• 15/12/25	• 12/12/28
Fire - Weekly Log/Inspection	• 52	• 52	• 52	• 52	• 52
General Services	• 3	• 108	• 50	• 52	• 52
Parks & Recreation	• 3	• 9	• 1	• 1	• 1
DTM - Streets & Traffic	• 12	• 12	• 12	• 12	• 12
DTM - Stormwater	• 1	• 1	• 1	• 1	• 1
Tucson Water (well sites x inspection per year if performed twice weekly)	• 17,760	• 17,760	• 16,952	• 15,600	• 16,694
<b>Date of last review of site-specific materials handling and spill response procedures</b>					
Environmental Services	• 1/2017	• 2018	• 6/2020	• 6/2020	• 9/2021
Fire - Weekly Inspections	• 7/27/17	• 6/28/17	• 6/29/18	• 5/15/20	• 4/30/2021
General Services	• 2016	• 2018	• 2019	• 9/16/20	• 9/2021
Parks & Recreation	• June 2016	• N/A	• N/A	• N/A	• 6/17/2021
DTM - Streets & Traffic	• 12/2016	• 6/2018	• 6/2019	• 6/2020	• 6/2021
DTM - Stormwater	• 6/12	• 6/2018	• 6/2020	• 1/2020	• 9/2020
Tucson Water	• 3/31/17	• 3/31/18	• 2/28/19	• 2/26/20	• 2/19/2021

### C. Outfall Inspection and Illicit Discharge Detection and Elimination Activities (DTM-Stormwater)

The permit requires that the City maintain an inventory or map of all major outfalls and of other field screening points (Lakeside Lake, Atterbury Wash).

- The City shall conduct ongoing dry weather field screening of major outfalls and other screening locations.
- The City shall inspect priority outfalls once each year.
- At a minimum, the City shall inspect 20% of the non-priority outfalls each year.
- The City shall document inspections, findings and report evidence of non-stormwater flows, and follow-up actions taken by the City.

<b>STORMWATER MANAGEMENT PRACTICE OR ACTIVITY</b>	<b>2016-17</b>	<b>2017-18</b>	<b>2018-19</b>	<b>2019-20</b>	<b>2020-21</b>
Total number of outfalls identified to date	• 500	• 500	• 500	• 500	• 500
Total number inspected	• 100	• 100	• 100	• 100	• 100
Number of priority outfalls identified	• 14	• 14	• 14	• 14	• 14
Number of 'priority outfalls' inspected	• 14	• 14	• 14	• 14	• 14

Number of dry weather flows detected	• 2	• 0	• 0	• 0	• 2
Number of dry weather flows investigated	• 2	• 0	• 0	• 0	• 2
Number of major outfalls sampled during dry weather flow	• 0	• 0	• 0	• 0	• 0
Number of illicit discharges identified	• 0	• 0	• 0	• 0	• 0
Number of illicit discharges eliminated	• 0	• 0	• 0	• 0	• 0*

#### D. Inspections for Potential illicit Discharges (DTM Stormwater and Tucson Water)

- The Stormwater Section shall inspect the drainage system in response to reports of potential illicit discharges. These reports may be received from Parks and Recreation or Streets and Traffic Maintenance as a result of their annual, priority inspections of the storm drain system.
- If non-storm connections (pipes, hose or channel carrying non-storm flow) are detected, the Stormwater Section shall be notified to investigate to determine if they are a source of pollutants, and the Stormwater Section shall use escalating enforcement action to eliminate these connections.
- The City shall respond to reports of dry weather flow including irrigation overflow, irrigation ponding or other incidents of wasting water, Tucson Water shall investigate and use escalating enforcement actions to correct these situations.

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2016-17	2017-18	2018-19	2019-20	2020-21
<b>DTM Stormwater:</b>					
Miles of Stormwater drainage system inspected for illicit discharges	• 383	• 383	• 338	• 383	• 383
Total Number of investigations of non-storm connections (cross connections) to stormwater drainage features	• 0	• 1	• 0	• 0	• 1
Total Number of pollution carrying, non-storm flows detected	• 1	• 1	• 0	• 1	• 2
Total Number of non-storm, pollution carrying connections eliminated (DTM Storm)	• 1	• 0	• 0	• 1	• 2
Number of verbal warnings	• 306	• 175	• 131	• 1	• 4
Number of written warnings	• 0	• 4	• 4	• 1	• 2
Total number turned over to court for enforcement action	• 0	• 0	• 0	• 0	• 2
Number of corrective or enforcement actions initiated within 60 days of inspection and identification	• 0	• 0	• 0	• 1	• 2
Percent of cases resolved or transferred to City Court System within 1 calendar year of original enforcement action	• 0	• 0	• 0	• 0	• 0
Number of illicit discharge reports received	• 78	• 136	• 145	• 155	• 117
Percent of illicit discharge reports responded to	• 100	• 100	• 100	• 100	• 100
Percent of responses initiated within 3 business days	• 100	• 100	• 100	• 100	• 100
<b>Tucson Water</b>					
Total number of incidents of over-irrigation, irrigation overflow and ponding investigated	• 514	• 375	• 322	• 240	• 112
Total number of verbal warnings for above	• 270	• 175	• 299	• 215	• 66
Total number of written warnings for above	• 1	• 0	• 1	• 0	• 0
Total number turned over to court for enforcement action	• 0	• 0	• 0	• 0	• 2

Total number of corrective or enforcement actions initiated within 60 days of inspection and identification	• 0	• 0	• 0	• 0	• 2
Total percent of cases resolved or transferred to City Court System within 1 calendar year of original enforcement action	• 100%	• N/A	• N/A	• 0	• 0

#### IV. Municipal Facility Stormwater Program

##### A. Municipal Facility Pollution Prevention/Good housekeeping Employee Training

For employees directly involved in certain activities (see list below) the permit requires that the City provide training for new employees once per year and refresher training for existing employees every two years.

1. Proper street repair and road improvement practices to minimize dischargers to the storm drain system
2. Specific Procedures and spill management practices to prevent or minimize spills or discharges to the storm drain system
3. Proper handling, storage, transportation, and disposal of used oil and other toxic and hazardous materials and wastes to prevent spills, exposure to rainfall, and contamination of stormwater runoff.
4. Stormwater specific Training: Staff involved in stormwater inspections including General Services (SWPPP for Price), Environmental Services (SWPPP for Los Reales), and the Stormwater Section shall be trained in stormwater quality management practices and pollution prevention plans. Other stormwater training topics include: Floodplain and Erosion Hazard Management Ordinance, Watercourse Maintenance Guidelines, supporting development standards of the Tucson Code, stormwater regulations and permit requirements.

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2016-17	2017-18	2018-19	2019-20	2020-21
Number of training events (topics 1,2,3 above)					
Environmental Services	• 1/7	• 6	• 2	• 3	• 3
Fire	• 0	• 2	• 2	• 2	• 2
General Services	• 1	• 1	• 0	• 0	• 0
Parks & Recreation	• 6	• 3	• 2	• 2	• 8
PDSB	• 36	• 45	• 26	• 38	• 26
DTM - Engineering	• 7	• 6	• 3	• 1	• 18
DTM - Streets & Traffic	• 1	• 3	• 0	• 12	• 3
DTM - Stormwater	• 99	• 45	• 3	• 25	• 24
Tucson Water	• 1	• 1	• 6	• 3	• 10
Total Number of staff trained					
Environmental Services drivers/HHHW/EMP)	• 456/104/6	• 474/6/10	• 15/5/10	• 12/5/14	• 15/3/1
Fire	• 0	• 4	• 5	• 4	• 6
General Services	• 1	• 3	• 0	• 0	• 1
HR	• 0	• 0	• 0	• 0	• 0
Parks & Recreation (monthly/RCRA/spills)	• 41	• 9	• 11	• 4	• 96
PDSB	• 3	• 5	• 5	• 5	• 5
DTM - Engineering	• 7	• 16	• 27	• 17	• 18
DTM - Streets & Traffic	• 86	• 8	• 0	• 7	• 5
DTM - Stormwater	• 16	• 5	• 5	• 6	• 7
Tucson Water	• 25	• 25	• 90	• 90	• 10

Number of Stormwater Specific Training Sessions/number trained (Topic 4 above)					
Environmental Services (Los Reales SWPPP)	• 0	• 0	• 0	• 1/1	• 1/1
General Services (Price SWPPP)	• 2	• 0	• 0	• 2/22	• 0
Parks & Recreation	• 6	• 3	• 2	• 1/1	• 0
PDSB	• 3	• 5	• 5	• 52/5	• 5
DTM - Engineering	• 0	• 6	• 5	• 3/17	• 4/7
DTM - Streets & Traffic	• 1/86	• 0	• 0	• 2/7	• 4/4
DTM - Stormwater	• 16	• 45	• 5	• 48/6	• 64/7
Tucson Water	• 1	• 1	• 6	• 3	• 10

### B. Municipal Facility Inventory (DTM Stormwater MAIT's)

MAIT's was discontinued due to COVID-19 to reduce exposure concerns as these inspections typically entailed having a group of staff walk together through confined areas in some cases to inspect facilities for safety issues. The facilities list (\*\*\*) will be updated to provide a smaller list of facilities that will be exclusively inspected for Floodplain and Stormwater regulatory safety compliance by DTM Stormwater Inspection staff.

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2016-17	2017-18	2018-19	2019-20	2020-21
Total number of facilities on inventory	• 221	• 221	• 207	• 126	• 126**
Date identification of "higher risk" facilities complete and date of prioritization of municipal facilities completed	• Dec 15 *	• Dec 2017	• June 2019	• June 2020	• June 2021
Number of municipally-owned high risk facilities identified	• 12	• 12	• 12	• 12	• 12

### C. Inspections of Stormwater drainage system (storm drains, Washes, Detention and retention Basins, and roadside drainage features)

The City shall conduct visual inspections of drainage features to identify the presence of non-storm discharges, excess sediment, litter, debris or other pollutants that may obstruct flow or be transported in stormwater, and to determine maintenance needs.

- The City shall define areas of the drainage system that are a priority for inspection, based on system history, and other factors, these priority areas shall be inspected at least once per year.
- If non-storm connections (pipes, hose or channel carrying non-storm flow) are detected, the Stormwater Section shall be notified to investigate to determine if they are a source of pollutants, and the Stormwater Section shall use escalating enforcement action to eliminate these connections.

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2016-17	2017-18	2018-19	2019-20	2020-21
Miles of MS4 drainage system prioritized for inspection					
Parks & Recreation	• 23.2	• 23.2	• 23.2	• 23.2	• 23.2
DTM - Streets & Traffic	• 383	• 383	• 383	• 383	• 383
Miles of priority drainage system visually inspected					
Parks & Recreation	• 2.1	• 4	• 5	• <3	• <3
DTM - Streets & Traffic	• 385	• 363	• 266	• 284	• 350

#### D. Inspections of Higher Risk Municipal Facilities

The permit requires the City to prioritize high risk municipal facilities based on the potential to cause a substantial pollutant load. The City has identified the following municipal facilities as High Risk:

- Parks & Recreation: El Rio, Fred Enke, Randolph, and Silverbell Golf Courses
- General Services: Price Service Center
- Environmental Services: Household Hazardous Waste
- Tucson Fire Department – HazMat Storage Facility

These facilities shall be inspected every two years and shall note any improvements needed. Recommended improvements shall be initiated within 3 months of the inspection and a schedule established for implementation. The City shall maintain a system for tracking the status of improvements and date(s) of implementation.

- The City shall develop practices to facilitate the proper management and disposal of used oil and other toxic materials.
- The City shall develop a program to minimize pollution from pesticide/herbicide use at City facilities. Tucson shall only apply pesticides that are Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) approved for aquatic use in any area within or adjacent to waters of the US, including dry washes. Research will be performed to check for safety issues related to pesticide/herbicide application.

Total Number of “higher risk” municipal facilities inspected	• 7	• 30	• 18	• 17	• 17
Parks & Recreation	• 3	• 3	• 3	• 3	• 3
General Services	• 1	• 12	• 12	• 11	• 11
Environmental Services	• 2	• 14	• 2	• 2	• 2
Tucson Fire	• 1	• 1	• 1	• 1	• 1
Total Number of “higher risk” municipal facilities found needing improved stormwater controls	• 7	• 0	• 0	• 0	• 0
Parks & Recreation	• 0	• 0	• 0	• 0	• 3
General Services	• 0	• 0	• 0	• 0	• 0
Environmental Services	• 0	• 0	• 0	• 0	• 0
Tucson Fire	• 0	• 0	• 0	• 0	• 0

#### E. Infrastructure Maintenance

The City shall address maintenance needs identified as deficient by inspections, monitoring, or other reporting including: maintenance and cleaning of linear drainage system, municipal retention and detention basins and municipal streets used for stormwater conveyance, catch basins, and storm drain inlets.

- The City shall evaluate drainage system maintenance priorities and update the inspection schedule at least once per year.

The City shall sweep municipal roads, and within Parks, roads and parking areas

- The City shall evaluate street sweeping frequency at least once a year.
- The City shall develop a control measure field manual for municipal maintenance activities including: paving and road repairs, saw cutting, concrete work, curb and gutter replacement, buried utility repairs and installation, vegetation removal, street and parking lot striping, drainage channel cleaning

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2016-17	2017-18	2018-19	2019-20	2020-21
Total Linear miles of drainage channel cleaned (city to maintain records documenting specific street cleaning events)					

Parks & Recreation	• <5	• <3	• <3	• <3	• <3
DTM - Streets & Traffic	• 83	• 97	• 97	• 83	• 108
<b>Linear miles of closed conduit cleaned</b>					
Parks & Recreation	• <1	• <1	• <1	• <1	• <1
DTM - Streets & Traffic	• 14 sites	• 10 sites	• 5 sites	• 5 sites	• 4 sites
<b>Street sweeping (Total broom miles)</b>					
Parks & Recreation	• 75	• 75	• 95	• 45	• 146
DTM - Streets & Traffic	• 23,901	• 20,769	• 22,977	• 22,056	• 19,121
<b>Amount of waste collected from street and lot sweeping (tons)</b>					
Parks & Recreation *(cu/yards)	• 49	• 49.5	• 52.6	• 22.5	• 77
DTM - Streets & Traffic (tons)	• 7,174	• 6,986	• 6,439	• 7,797	• 11,016
<b>Total Number of public retention/detention basins cleaned</b>					
Parks & Recreation	• 3	• 0	• 5	• 4	• 5
<b>Total number of catch basins identified to date</b>					
Parks & Recreation	• 47	• 47	• 47	• 47	• 49
DTM - Streets & Traffic	• 1,168	• 1,168	• 1,168	• 1,168	• 1,168
<b>Total Number of catch basins cleaned</b>					
Parks & Recreation	• 5	• 8	• 7	• 10	• 9
DTM - Streets & Traffic	• 50	• 143	• 202	• 105	• 35
DTM - Stormwater	• 0*	• 30*	• 26*	• 5	• 4

\*Stormwater Inspector requested for cleanup to Transportation & Mobility Streets Division

## V. Industrial Stormwater Program (DTM-Stormwater)

### A. Municipal Employee Training

The permit requires that the City provide training for new employees once per year and refresher training for existing employees every two years. Training shall include educating and updating stormwater inspectors on stormwater management requirements for industrial and commercial activity.

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2016-17	2017-18	2018-19	2019-20	2020-21
Number of training events for MS4 staff	• 36	• 45	• 29	• 61	• 12
Number of staff trained	• 3	• 5	• 5	• 6	• 3

### B. Inventory

The city shall develop and maintain an inventory of facilities that have the potential to discharge pollutants to the MS4. The list shall include industrial facilities subject to MSGP requirements, other industrial and commercial sources which the City determines to be a significant source of pollutants.

- The City shall inspect a minimum of 20% of the facilities on the inventory, including re-inspections as necessary. For this reporting period, turnover for Inspection staff occurred and three new Inspectors in addition to other staff were being trained before performing these inspections.

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2016-17	2017-18	2018-19	2019-20	2020-21
Number of Industrial facilities inspected					
Total number of facilities on priority list	• 72	• 28	• 3*	• 8	• 19

### C. Enforcement Actions

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2016-17	2017-18	2018-19	2019-20	2020-21
Number of corrective or enforcement actions initiated on industrial facilities	• 17	• 10	• 2	• 4	• 2
Percent of cases resolved within one (1) calendar year of original enforcement action	• 17	• 10	• 2	• 4	• 2
Number of cases referred to the City Court System	• 0	• 0	• 0	• 0	• 0

## VI. Stormwater Construction Program Activities

### A. Municipal Employee Training

For employees directly involved in review and inspection of Construction sites requiring Stormwater General Permit Requirements and review and inspection of Post Construction Controls, the permit requires that the City provide training for new employees once per year and refresher training for existing employees every two years.

- Training for plan reviewers shall include:

Grading and drainage design standards, plan review procedures, municipal ordinances related to stormwater and construction, requirements for structural and non-structural control measures on construction sites, Post-Construction stormwater controls.

- Training for inspectors shall include:

Municipal ordinances related to stormwater and construction, requirements for structural and non-structural control measures on construction sites, Construction BMP maintenance requirements, inspection procedures, and enforcement procedures.

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2016-17	2017-18	2018-19	2019-20	2020-21
Total Number of training events for SWPPP plan review staff					
PDS	• 26	• 30	• 28	• 38	• 26
DTM -Engineering (CIP)	• 15	• 6	• 3	• 5	• 12
DTM -Engineering (ROW/PIA/excavation)	• 20	• 8	• 8	• 6	• 12
Tucson Water	• 0	• 0	• 0	• 0	• 0
Total Number of Training Events for Inspection Staff					
PDS	• 50	• 45	• 52	• 38	• 26
DTM -Engineering (CIP)	• 15	• 6	• 18	• 3	• 3
DTM -Engineering (ROW/PIA/excavation)	• 20	• 6	• 26	• 52	• 24
Tucson Water	• 0	• 0	• 0	• 0	• 0
Total Number of staff trained					
PDS	• 3	• 5	• 5	• 5	• 5
DTM -Engineering (CIP)	• 5	• 16	• 31	• 6	• 20
DTM -Engineering (ROW/PIA/excavation)	• 16	• 16	• 17	• 10	• 18
Tucson Water	• 0	• 0	• 0	• 0	• 0

### B. Plan Review

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2016-17	2017-18	2018-19	2019-20	2020-21
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Number of grading plans/SWPPPs submitted for review					
PDS	• 110	• 55	• 121	62	• 72
DTM -Engineering (CIP)	• 3	• 2	• 5	2	• 2
DTM -Engineering (ROW/PIA/excavation)	• 4	• 1	• 5	• 8	• 3
DTM -Stormwater	• 0	• 0	• 6	• 8	• 4
Tucson Water	• 0	• 3	• 3	• 0	• 0
# of ground disturbing permits issued that meet the AZPDES Construction General Permit eligibility					
PDS	• 70	• 48	• 88	• 56	• 51
DTM -Engineering (CIP)	• 2	• 2	• 5	• 2	• 2
DTM -Engineering (ROW/PIA/excavation)	• 1	• 1	• 4	• 8	• 3
Number of construction/grading plans reviewed for those that fall under AZPDES					
PDS	• 70	• 75	• 88	• 127	• 148
DTM -Engineering (CIP)	• 2	• 2	• 5	• 2	• 2
DTM -Engineering (ROW/PIA/excavation)	• 1	• 1	• 4	• 21	• 3
DTM -Stormwater	• 0	• 0	• 6	• 8	• 1
Tucson Water	• 0	• 0	• 2	• 0	• 0

Number of AZPDES permitted construction sites					
PDS	• 50	• 99	• 59	• 147	• 155
DTM -Engineering (CIP)	• 2	• 1	• 6	• 4	• 3
DTM -Engineering (ROW/PIA/excavation)	• 1	• 1	• 4	• 21	• 3
DTM -Stormwater	• 0	• 0	• 5	• 8	• 1
Tucson Water	• 0	• 0	• 1	• 1	• 0

### C. Inspections and Enforcement Actions

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2016-17	2017-18	2018-19	2019-20	2020-21
# of AZPDES construction sites inspected					
PDS	• 20	• 43	• 28	• 52	• 41
DTM -Engineering (CIP)	• 2	• 3	• 12	• 4	• 3
DTM -Engineering (ROW/PIA/excavation)	• 2	• 2	• 4	• 21	• 5
# of corrective or enforcement actions initiated on construction facilities					
PDS	• 115	• 268	• 215	• 310	• 265
DTM -Engineering (CIP)	• 5	• 4	• 3	• 0	• 0
DTM -Engineering (ROW/PIA/excavation)	• 0	• 0	• 0	• 2	• 0
Number of corrective actions resolved					
PDS	• 115	• 268	• 215	• 310	• 265
DTM -Engineering (CIP)	• 5	• 4	• 3	• 0	• 0
DTM -Engineering (ROW/PIA/excavation)	• 0	• 0	• 0	• 2	• 0
Total Number of corrective actions turned over to the City Court System					
PDS	• 0	• 0	• 0	• 0	• 0

DTM -Engineering (CIP)	• 0	• 0	• 0	• 0	• 0
DTM -Engineering (ROW/PIA/excavation)	• 0	• 0	• 0	• 0	• 0

## VII. Post Construction Program Activities

The City shall inspect projects in the post-construction phase to ensure controls are installed, and are being maintained.

- The City shall inspect at least 75% of the sites that have received permits for ground disturbing activities within 1 year following construction to determine the effectiveness of stormwater controls.
- The City shall develop an inspection, maintenance and tracking program, and shall report the number of sites that receive post-construction inspections.
- The City shall implement an effective compliance and escalating enforcement program.
- The City shall assign maintenance responsibility for post construction controls through policies, maintenance agreements, or easements.

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY	2016-17	2017-18	2018-19	2019-20	2020-21
Number of post-construction inspections completed					
PDSO	• 2,880	• 2,684	• 2,518	• 3112	• 2650
DTM -Engineering	• 5	• 4	• 4	• 3	• 6
DTM -Streets & Traffic	• N/A				
PIA/ROW	• 5	• 2	• 2	• 3	• 26
DTM -Stormwater	• 20	• 5	• 4	• 15	• 36
Number of corrective or enforcement actions initiated for post-construction activities					
PDSO	• 10	• 15	• 9	1	• 3
DTM -Engineering	• 0	• 0	• 0	• 1	• 3
DTM -Streets & Traffic	• N/A				
PIA/ROW	• 0	• 0	• 0	• 0	• 0
DTM -Stormwater	• 0	• 0	• 0	• 2	• 3



TCB, DTM Streets/Engineering/Landscaping Staff work together to perform watercourse assessment for potential new trees

## PART 5 EVALUATION OF THE STORMWATER MANAGEMENT PROGRAM

The City's Stormwater Management Program has been overall effective during this report year, although seasonal sampling had been less effective due to notification issue with the sampling equipment and low precipitation during the Summer and Winter seasons. There were also changes to MAIT's inspections due to COVID-19 and the inspections were discontinued by the Safety Group. However DTM Stormwater Management intends to resume inspections for some of these public facilities by performing new stormwater and floodplain management inspections annually for public facilities identified by The Safety Group and Risk Management.

The City's Stormwater Management Program received feedback on stormwater outreach which demonstrated that 86% of respondents perceive Tucson to have a "moderate" stormwater pollution problem, and this awareness helps to increase the effectiveness of the program, as indicated from the regional 2020-2021 Clean Air/Water Survey results. Contact, through outreach events, has also demonstrated that the general public is interested in keeping stormwater clean and willing to do their part to help.

During, albeit limited, industrial and construction inspections, staff noted that the operator's base knowledge continues to improve and they are amiable to learning and complying with the stormwater regulations. During one industrial inspection in the previous fiscal year of a fire protection company, discussion with the local business indicated a change from using environmentally safer substances to less safe compounds due to pricing. The awareness of PFAS in the environment appears to be increasing and DTM Stormwater Management has provided PFAS sampling from the stormwater sampling site 2 for Tucson Water to test.

For student housing areas, where the majority of reported discharges have been determined to be de minimis discharge activities, stormwater management with assistance by PDSD, Tucson Water, and EGSD (waste management and code enforcement) continues to provide regular inspections and monitoring to look for illicit discharges. Complaints for pool water discharges and trash pick-up containers have lessened as sources of illicit discharges from the student housing properties downstream of the University and notices of violation of code / court case have occurred during the latter part of 2020. The Code Enforcement staff from EGSD assisted Stormwater Management under the City Manager's Memorandum of Understanding to require retrofit / Corrective Action Plan reporting during 2021 from the violating student housing owner to address the illicit discharges.

For reporting year 2020-2021, neighborhood IDDE outreach response events continue to be successful for SFR residential subdivision pool issues. For the other neighborhood IDDE response events, additional monitoring is needed to see if the outreach is effective, especially for neighborhood areas where dog poop was allegedly thrown over the backyard walls into watercourses. Although there was an increase in gray water complaints, there was no concentration of areas where neighborhood outreach response would have been effective.

Regarding watercourse preservation and maintenance, Police, Department of Parks and Recreation, and DTM have worked with Stormwater Management and continue to increase concentrated efforts to clean up segments of publicly maintained watercourses that have homeless debris and encampments. Although Homeless Protocol process was suspended, cleaning efforts continue in watercourses throughout the City.

Maintenance staff continues to see a large volume in debris/trash removal since the last reporting year. A number of volunteer groups work to clean up washes and public places as an example of the dedication the public has for keeping the environment pollution free. The TCB Adopt-A-Wash program was active due to TCB's involvement and continued successful programs.



Spill Control Stations are inspected regularly

## PART 6 STORMWATER MANAGEMENT PROGRAM MODIFICATIONS

This Stormwater Management Program (SWMP) has been in use for 10 years. During this reporting period, some modifications have occurred to refine and improve the stormwater program. The City has purchased stormwater software (SAMS for Stormwater) to improve the inspection and sampling process and although there have been fine-tuning and new sub-projects created and to be created, the City has been using the new equipment and software successfully. The stormwater sampling equipment was installed summer 2018 and calibration has been completed, however some modifications to the notification device for the sampling equipment is being completed. In 2019-2020, new SAMS software was created to provide digital inspection reporting for IDDE, major outfalls, and FSO's. Stormwater Management is continuing to work with PDSD Grading and Engineering Inspection staff to develop an improved basin inspection notification system using SAMS software.

A new Program Manager was assigned to oversee the MS4 Program in February 2016. Three additional staff worked intermittently on inspections, public facility inspections, outreach, and other stormwater management duties during the FY2020-2021. New staff (DTM Engineering Manager, two full-time specialized Construction Inspectors replacing one Senior Engineering Associate, and an additional back-up Construction Inspector) working with the Program Manager and City Engineer / Floodplain Administrator since August 2020. The total number of Industrial and Commercial inspections were not completed for FY2020-2021 due to COVID-19, however the intent for FY2021-2022 is to achieve more than the average number of Industrial and Commercial Inspections. This is primarily due to the new and easy-to-use inspection forms for FSO's and IDDE's being generated in 2020 and other improvements by the new SAMS software, as well as staffing improvements, including the assistance from the Construction Inspection team. The Program Manager has DTM Streets staff for inspecting FSO's and there are also Construction Inspectors assigned for this program for Capital Improvement Project inspections, with special inspectors assigned to public facility inspections, IDDE, Industrial Inspections, training, and sampling duties. These inspectors perform monitoring and documentation for the DTM's construction activities, as well as assist with IDDE inspection response. DTM Streets staff who currently inspect stormdrain systems annually perform the Stormwater Management's FSO outfall inspections, since this activity was identified as an overlapping, redundant activity. All current Construction Inspectors have been trained to perform AZPDES SWPPP construction inspection. A more concentrated effort will be placed on training for staff (OSHA, RCRA, HAZ MAT, HAZWOPER, Industrial, and other Stormwater related training).

DTM is the lead department for Stormwater Management in the City. Meetings with all other departments occur each quarter or as needed to discuss issues. The Stormwater Management team will be continuing to update training modules for both "on-boarding" (new hires) as well as specialized training for Parks Department, TOPSC and other EGSD staff that perform stormwater tasks. DTM Stormwater Management will work with Parks and Recreation on their new GIS stormwater map to assure implementation of park stormwater inspections utilize their new tool efficiently. DTM will continue to add Only Rain in the Drain markers to new Capital project inlets. Stormwater Management staff will continue to attend ADEQ and Stormwater Coalition meetings to contribute stakeholder input to upcoming new general MS4 Large (Phase 1) permit, and other permits, and new procedures for reporting improvements. Stormwater Management will continue to assist the Streets staff within DTM as well as multiple departments and agencies in their efforts to address the marked increase in homeless issues within the watercourses.

The City stormwater staff anticipates attending the following public outreach events for FY 2021-2022 that are intended to encourage stormwater pollution prevention and awareness: Family Festival in the Park

(November 2021), E-Week Park Mall Event (February 2022), Tucson Children's Earth Day at Children's Museum (April 2022), EHSS Vendor Fair at Raytheon (May 2022), Monsoon Safety Awareness Week (June 2022), Juneteenth Event (June 2022), Arizona Bilingual Back-to-School Bash sponsored by Ward I and Ward V (July 2022), and Tucson Association of Realtors EXPO (August 2022) at the Tucson Convention Center.

In September 2019, Mayor and Council approved the Green Stormwater Infrastructure Program (GSI) which continues to assist with funding toward design, installation, training, performance and maintenance of public green infrastructure. This program uses a monthly utility fee to finance Green Stormwater Infrastructure projects. This GSI fee generates up to \$3 million per year, which is being used to maintain and build City projects capturing stormwater from parking lots and roads, while increasing shade from new trees planted, reducing heat island effect, enhancing parks, neighborhood streets, and pedestrian areas.

DTM Stormwater Management will work with PDS Building Official and Engineering Review staff to assure student housing development review is checking for stormwater features that will function and comply with Stormwater regulations. This checklist will include: review of condensate from air conditioning systems are directed to onsite landscaping if area is available, or directed to sanitary system; jacuzzi backwater and flushing systems; landscape planter bypass systems for roof drains pool systems; solid waste pick-up areas located in an area that drains to sanitary cleanout; and that that these facilities are asked to contact Stormwater Management to provide courtesy notifications for annual potable water testing by Tucson Water, annual sprinkling system testing by Fire, or periodic pool flushing. Code Enforcement will continue to assist DTM Stormwater Management to address IDDE at the student housing area west of the university campus.

Additional sampling site calibration is expected over the next reporting period as well as installation of missing 750 Flow meter at sampling site #1 and trouble-shooting sampling site #3 for stop-start issues. Maintenance protocol for regional City owned basins will be updated for the upcoming reporting period to include both DTM Inspector, DTM Landscaping, and DTM Engineering staff for these inspections.

DTM Stormwater Management will continue to provide PFAS sampling from the stormwater sampling sites for Tucson Water to test.



Paints to be used in drainage systems (such as the Bronx Wash concrete channel) are reviewed for toxic materials.

## PART 7 MONITORING LOCATIONS

Stormwater is monitored at five locations within the City. See table below for Sampling Station locations.

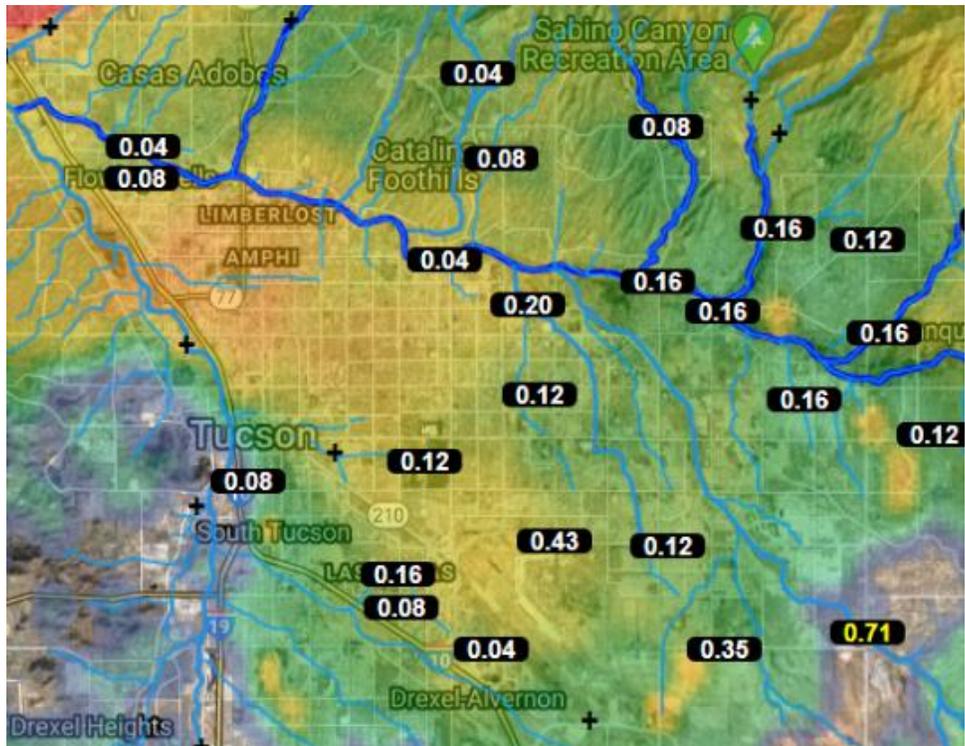
Site	Land Use	Physical Location	Location	Watershed Area (acres)	Receiving Waters *
1	Single Family Residential	Grant Road & Wilson Avenue	32° 15' 02.83" N 110° 56' 15.23" W	400	SC
2	Multi-family Residential	Greenlee Road	32° 16' 14.9" N 110° 53' 56.88" W	49	R, SC
3	Commercial	Randolph Way & El Con Mall	32° 13' 16.16" N 110° 55' 04.77" W	38**	SC
4	Industrial	17 <sup>th</sup> Street	32° 12' 48.33" N 110° 57' 12.33" W	91	SC
5	Mixed Use	First Avenue at Limberlost Road	32° 16' 58.28" N 110° 57' 40.35" W	380	R, SC

\* Receiving Waters: SC = Santa Cruz River, R = Rillito River, P = Pantano Wash, TV = Tanque Verde

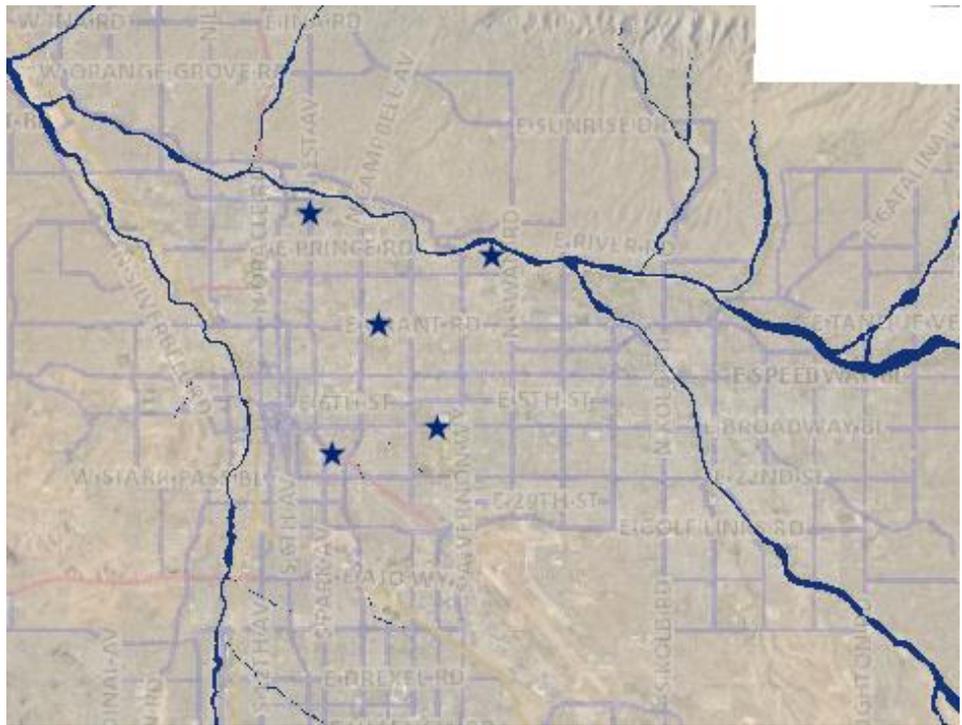
The stormwater runoff from Sites 2 and 5 flows to the Rillito River and then to the Santa Cruz River. The other sites flow directly into the Santa Cruz River. At the discharge points, the Santa Cruz and Rillito are both normally dry, ephemeral washes with no aquatic habitat.

All five of the City's monitoring stations are equipped with automated sampling equipment. The automated equipment is programmed to collect flow-weighted samples at fixed time intervals. The City purchased and installed new stormwater sampling equipment for each of our five sites with final equipment installation in November of 2018. Calibrations occurred through Fall of 2018 and early 2019, and Fall 2020. Since installation of SAMS (Stormwater module) Software in May 2019, the City continues to fine tune the new equipment, while continuing to work with consultant to create customize software to provide a more effective sampling program. Additional sampling site calibration is expected over the next reporting period as well as installation of missing 750 Flow meter at sampling site #1. Samples are composited at the laboratory based on storm hydrographs to achieve a flow-weighted composite for analysis.

Sampling opportunities were minimal for this reporting period due lack of rain events for July 1, 2020 through June 30, 2021. Rainfall data from rain gauges at the sampling sites trigger notification of rain occurring at each site. Sampling sites 2, 3, and 4 are near county rain gauges that are maintained by the Pima County Regional Flood Control District that provide additional precipitation and other hydrologic data: <https://alertmap.rfcd.pima.gov/gmap/gmap.html> The adopted Tucson Floodplain Management Plan 2020 includes a goal to increase the number of rain gauges in the metropolitan Tucson area to provide increased accuracy in rain data. DTM Stormwater Management would benefit from placement of at least two new gauges close to sampling sites 1 and 5. See exhibits below for locations of the stormwater management sampling sites and the locations of the county rain gauges in the City of Tucson area.



County-owned rain gauges, shown above, are situated throughout the Tucson area although not located close to stormwater sampling sites #1 (central site) and #5 (northwestern site) as shown below.



## PART 8 STORM EVENT RECORDS

Rainfall (RF) in inches at each site (1,2,3,4,5) along with the status of the site and sampling.

	Date	1	RF	2	RF	3	RF	4	RF	5	RF
	Summer Season	1JUN20									IF
11JUL20						SC, EF	.23				
11JUL20				IF	.08						
18JUL20				IF	.08						
23JUL20		SC	1.18								
23JUL20				SC	1.10						
23JUL20										SC	0.28
23JUL20						C	0.24				
Winter Season	23JUL20							IS	0.39		
	9NOV20									IF	.25
	10DEC20							SC	0.20		
	10DEC20					IF	0.20				
	10DEC20			IS	0.20						
	25JAN21			IF	0.16						
	26JAN21			72	0.08						
	10FEB21									EF	0.0
	13MAR21									NC	0.48
	20APR20					NC	0.39				

### Key

72	Station closed for 72 hours	IS	Insufficient Staff
C	Site Closed - sampling completed for season	LB	Laboratory Closed
DC	Dangerous Conditions: Tornado, Lightning, other	NC	Not on-call -unforecasted event
EF	Equipment Issue (sampler stopped at site 3 on 11JUL20)	NF	No Flow
IF	Insufficient Flow (to collect sample)	SC	Sample Collected

# PART 9 SUMMARY OF MONITORING DATA (BY LOCATION)

## I. Sample Site 1

Site ID: 1 Grant/Wilson Receiving Water: Santa Cruz Land Use: SFR		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31																	
		Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
		2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016	2016-17	2017	2017-18	2018	2018-19	2019	2019-20	2020	2020-21
Sampling Date(s):		7/20/12	12/19/12	8/2/13	11/22/13	7/3/14	12/13/14	8/1/15	11/15/15	9/7/16	1/14/17	7/28/17	1/20/18	10/1/18	***	***	12/27/19	7/23/20	***
<b>Monitoring Parameters</b>		<b>SWQS</b>																	
<b>Conventional Parameters</b>																			
Flow	n/a	1.18	1.24	12.57	1.55	2.04	4.49	2.71	0.76	17.84	7.65	24.92	17.56	3.54			10.26	145	
pH	6.5 - 9	7.33	8.55	8.11	8.2	5	5	7.5	7.7	7.5	8.1	7.3	7.3	7.3			6.5	7.0	
Temperature	n/a	84	49	84	62	92	58	84	70	60	56	43	40	71.4			48	78	
Hardness	<400	48	53	56	34	110	30	46	44	55	88	120	47	78			80	150	
TDS (mg/L)	n/a	180	110	88	69	390	60	63	84	180	66	180	140	180			120	250	
TSS (mg/L)	n/a	110	120	250	180	310	68	140	170	44	190	300	79	31			150	580	
BOD (mg/L)	n/a	74	110	20	25	21	29	17	23	36	10	38	39	20			91	51	
COD (mg/L)	n/a	250	110	190	240	750	70	120	170	260	83	220	250	120			140	260	
<b>Inorganics</b>																			
Cyanide, total (ug/L)	84	<100	<5	38	<38	41	<82	<33	38	<25	<28	<28	1.2	<36			59	<36	
<b>Nutrients (mg/L)</b>																			
Nitrate + Nitrite as N	n/a	1.3	0.1	1.1	1	1.7	0.89	0.86	0.87	0.53	0.84	7.1	1.2					1.1	
Ammonia as N	n/a	1.8	0.5	0.87	0.5	3.7	0.083	0.25	0.5	0.94	0.094	0.078	1.3	<0.078			0.43	0.61	
Total Kjeldahl Nitrogen (TKN)	n/a	4.9	1.9	3.1	2.7	23	1.5	1.9	1.9	3.6	1.8	5.2	3.8	1.2			1.7	6.3	
Total Phosphorus	n/a	0.38	0.6	2.4	0.44	2.1	0.34	0.41	0.46	0.24	0.41	0.55	0.39	0.4			0.08	0.86	
Total Orthophosphate	n/a	0.22	0.5	0.51	0.5	0.65	0.22	0.23	0.5	0.5	0.14	0.11	0.5				0.18	<0.18	
<b>Microbiological (MPN)</b>																			
Escherichia coli (E. coli)	575	2000	>2400	>2400	>2400	2400	>2400	2400	830	2400	2400	2400	820	2400			2400	2400	
<b>Total Metals (ug/L)</b>																			
Antimony	747	1.9	0.82	1.6	2.1	1.9	1.7	0.78	1	2.4	1.1	1.9	3.1	3.1			1.9	1.1	
Arsenic	200	6.7	40	4	40	9	4.6	8.7	6.8	8.3	4.7	11	5.9	24			17	14	
Barium	98,000	92	66	110	98	160	47	73	88	70	77	160	80	69			120	150	
Beryllium	1,867	2.0	2.0	0.17	2.0	0.93	0.93	0.22	2.0	2.0	1.3	0.33	0.33	0.33			0.33	<0.33	
Cadmium	<3 <sup>Note 1</sup>	0.29	2.0	0.16	2.0	0.82	0.82	0.28	2.0	2.0	1.4	0.87	0.87	0.087			0.87	<0.87	
Chromium	1,000	5.1	30	0.35	30	8.1	3.1	4.6	5.7	3.8	5	5.1	6.2	3.3			9.1	8.7	
Copper	<3 <sup>Note 2</sup>	50	33	46	47	110	22	32	44	49	28	59	52	38			32	66	
Lead	<17 <sup>Note 3</sup>	8.6	14	24	21	20	10	16	18	5	19	24	11	4.6			21	43	
Mercury	5	1.0	0.09	0.049	1.0	0.039	0.077	0.092	1.0	1.0	0.094	0.079	0.079	0.079			0.041	<0.041	
Nickel	<882 <sup>Note 4</sup>	9.6	50	4.1	50	16	1.9	2.9	6.7	8.4	5	6.4	5.7	4.7			7	13	
Selenium	33	0.68	0.35	0.4	0.14	1.1	0.082	0.2	2.5	0.37	0.46	1.2	2.5	0.59			0.25	0.26	
Silver	<0.14 <sup>Note 5</sup>	0.87	0.067	0.23	0.23	0.029	0.2	0.079	0.5	0.5	0.18	0.00027	0.000021	0.000021			0.00012	<0.000021	
Thallium	75	0.048	0.063	0.043	0.055	0.013	0.023	0.019	0.059	0.053	0.12	0.11	0.028	0.039			0.14	0.15	
Zinc	<235 <sup>Note 6</sup>	140	100	150	170	310	88	110	140	160	82	200	200	83			260	230	

Site ID: 1 Grant/Wilson		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31																	
Receiving Water: Santa Cruz		Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Land Use: SFR		2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016	2016-17	2017	2017-18	2018	2018-19	2019	2019-20	2020	2020-21
Sampling Date(s):		7/20/12	12/19/12	8/2/13	11/22/13	7/3/14	12/13/14	8/1/15	11/15/15	9/7/16	1/14/17	7/28/17	1/20/18	10/1/18	***	***	12/27/19	7/23/20	***
SWQS																			
<b>Organic Toxic Pollutants (mg/L)</b>																			
Total Petroleum Hydrocarbons	n/a	5.00	5.00	5.00	5.00	5.00	3.10	2.40	5.00	5.00	2.4	0.600	8.90	<1.35			4.02	<1.36	
Total Oil and Grease	n/a	5.00	5.00	5.00	6	6.4	3.80	1.90	5.9	5.00	5.1	1.7	17.5	<1.4			8.94	<1.40	
<b>VOCs, Semi-VOCs, and Pesticides (ug/L)</b>																			
Acrolein	467		10	10			0.76	0.76				0.76	3.0						
Acrylonitrile	37,333		10	10			0.65	0.65				0.65	2.6						
Benzene	3,733		2.0	2.0			0.25	0.48				0.48	1.9						
Bromoform	18,667		2.0	2.0			0.33	0.50				0.5	2.0						
Carbon tetrachloride	1,307		2.0	2.0			0.18	0.35				0.35	1.4						
Chlorobenzene	18,667		2.0	2.0			0.24	0.37				0.37	1.5						
Chlorodibromomethane	n/a		2.0	2.0			0.21	0.27				0.27	1.1						
Chloroethane	n/a		5.0	5.0			0.17	0.45				0.45	1.8						
2-chloroethyvinyl ether	n/a		10	10			0.56	0.56				0.56	2.3						
Chloroform	9,333		2.0	2.0			0.19	0.37				0.37	1.5						
Dichlorobromomethane	n/a		2.0	2.0			0.2	0.33				0.33	1.1						
1,2-dichlorobenzene	5,900		2.0	2.0			0.49	0.37				0.37	1.5						
1,3-dichlorobenzene	n/a		2.0	2.0			0.35	0.38				0.38	1.5						
1,4-dichlorobenzene	6,500		2.0	2.0			0.41	0.36				0.36	1.4						
1,1-dichloroethane	n/a		2.0	2.0			0.17	0.50				0.5	\$2.0						
1,2-dichloroethane	186,667		2.0	2.0			0.21	0.43				0.43	1.7						
1,1-dichloroethylene	46,667		2.0	2.0			0.28	0.59				0.59							
1,2-dichloropropane	84,000		2.0	2.0			2.0	0.45				0.45	1.8						
1,3-dichloropropylene	n/a		2.0	2.0			0.3	0.78				0.43							
Ethylbenzene	93,333		2.0	2.0			0.24	0.31				0.31	1.2						
Methyl bromide (Bromomethane)	n/a		2.0	2.0			0.21	0.49				0.49	2.0						
Methyl chloride (Chloromethane)	n/a		5.0	5.0			0.28	0.46				0.46	1.8						
Methylene chloride	n/a		10	10			0.28	0.47				0.47	1.9						
1,1,2,2-tetrachloroethane	93,333		2.0	2.0			0.50	0.40				0.4	1.6						
Tetrachloroethylene	9,333		2.0	2.0			0.29	0.38				0.4	1.6						
Toluene	373,333		2.0	2.0			0.26	0.32				0.32	1.3						
1,2-trans-dichloroethylene	n/a		2.0	2.0			0.23	0.48				0.48	1.9						
1,1,1-trichloroethane	186,666.667		2.0	2.0			0.23	0.34				0.34	1.3						
1,1,2-trichloroethane	3,733		2.0	2.0			0.32	0.59				0.59	2.4						
Trichloroethylene	280		2.0	2.0			0.19	0.47				0.47	1.9						
Trimethylbenzene	n/a		2.0	2.0			2.0	0.71				0.38	1.5						
Vinyl chloride (chloroethylene)	2,800		2.0	2.0			0.32	0.38				0.38	1.5						
Xylene	186,667		6.0	6.0			0.63	0.99				0.99	4.0						

Site ID: 1 Grant/Wilson	Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31																			
Receiving Water: Santa Cruz	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Land Use: SFR	2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016	2016-17	2017	2017-18	2018	2018-19	2019	2019-20	2020	2020-21		
Sampling Date(s):	7/20/12	12/19/12	8/2/13	11/22/13	7/3/14	12/13/14	8/1/15	11/15/15	9/7/16	1/14/17	7/28/17	1/20/18	10/1/18	***	***	12/27/19	7/23/20	***		
SWQS																				
<b>SVOCs - Acid Extractables (ug/L)</b>																				
2-chlorophenol	4,667	9.8	10			0.77	0.76													
2,4-dichlorophenol	2,800	9.8	10			0.63	0.62													
2,4-dimethylphenol	18,667	9.8	10			0.54	0.53													
4,6-dinitro-o-cresol (4,6-Dinitro-2-methylphe	3,733	20	20			0.89	0.88													
2,4-dinitrophenol	1,867	49	50			5	4.9													
2-nitrophenol	n/a	9.8	10			3.6	3.6													
4-nitrophenol	n/a	49	50			0.54	0.53													
p-chloro-m-cresol (4-Chlor-3-methylphenol)	n/a	9.8	10			0.62	0.61													
Pentachlorophenol	<18 <sup>Nov7</sup>	29	1.5			3.6	4.4													
Phenol	180,000	9.8	10			0.9	0.89													
2,4,6-trichlorophenol	130	9.8	10			0.82	0.81													
<b>SVOCs - Bases/Neutrals (ug/L)</b>																				
Acenaphthene	56,000	4.9	5			0.73	0.72													
Acenaphthylene	n/a	4.9	5			0.62	0.61													
Anthracene	280,000	4.9	5			0.7	0.69													
Benzo(a)anthracene	0.2	0.6	0.62			0.76	0.75													
Benzo(a)pyrene	0.2	4.9	0.77			0.56	0.55													
Benzo(b)fluoranthene	n/a	1.6	1.6			1.3	1.3													
Benzo(g,h,i)perylene	n/a	4.9	5			1.6	1.5													
Benzo(k)fluoranthene	1.9	1.6	1.6			1.3	0.55													
Chrysene	19	4.9	5			0.67	0.66													
Dibenzo(a,h)anthracene	1.9	0.93	0.96			0.91	0.9													
3,3'-dichlorobenzidine	3	0.99	1.0			1.5	1.5													
Diethyl phthalate	746,667	9.8	10			1.1	1.0													
Dimethyl phthalate	n/a	9.8	10			0.56	0.55													
Di-n-butyl phthalate	n/a	9.8	10			3.1	2.7													
2,4-dinitrotoluene	1,867	9.8	10			1.0	1.0													
2,6-dinitrotoluene	3,733	9.8	10			1.1	1.1													
Di-n-octyl phthalate	373,333	9.8	10			1.3	0.75													
1,2-diphenylhydrazine (as azobenzene)	1.8	9.8	10			1.0	0.99													
Fluoranthene	37,333	4.9	5.0			0.81	0.8													
Fluorene	37,333	4.9	5.0			0.6	0.59													
Hexachlorobenzene	747	9.8	10			1.1	1.0													
Hexachlorobutadiene	187	9.8	10			1.1	1.1													
Hexachlorocyclopentadiene	11,200	9.8	10			0.71	0.7													
Hexachloroethane	850	9.8	10			1.4	1.4													
Indeno(1,2,3-cd)pyrene	1.9	0.8	0.83			1.2	1.2													
Isophorone	186,667	9.8	10			0.82	0.81													

Site ID: 1 Grant/Wilson		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31																	
Receiving Water: Santa Cruz		Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Land Use: SFR		2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016	2016-17	2017	2017-18	2018	2018-19	2019	2019-20	2020	2020-21
Sampling Date(s):		7/20/12	12/19/12	8/2/13	11/22/13	7/3/14	12/13/14	8/1/15	11/15/15	9/7/16	1/14/17	7/28/17	1/20/18	10/1/18	***	***	12/27/19	7/23/20	***
SWQS																			
SVOCs - Bases/Neutrals (ug/L) continued																			
Naphthalene	18,667		4.9	5			0.78	0.77											
Nitrobenzene	467		9.8	10			1.1	1.1											
N-nitrosodimethylamine	0.03		1.6	1.6			2.3	2.2											
N-nitrosodi-n-propylamine	88,667		9.8	10			1.1	1.1											
N-nitrosodiphenylamine	n/a		9.8	10			0.89	0.88											
Phenanthrene	n/a		4.9	5			0.63	0.62											
Pyrene	28,000		4.9	5			0.57	0.56											
1,2,4-trichlorobenzene	9,333		9.8	10			0.96	0.95											
Pesticides (ug/L)																			
Aldrin	<0.003 <sup>Note8</sup>		0.098	0.1			0.016	0.013											
Alpha-BHC	n/a		0.098	0.1			0.01	0.02											
Beta-BHC	n/a		0.098	0.1			0.017	0.0099											
Gamma-BHC	n/a		0.098	0.1			0.023	0.039											
Delta-BHC	n/a		0.098	0.1			0.012	0.011											
Chlordane (alpha, gamma)	3.2		0.0134	<0			0.0078	0.0137											
4,4'-DDT	n/a		0.098	0.10			0.014	0.0069											
4,4'-DDE	n/a		0.098	0.10			0.010	0.0051											
4,4'-DDD	n/a		0.098	0.10			0.010	0.0099											
Dieldrin	<0.003 <sup>Note8</sup>		0.098	0.1			0.0084	0.0083											
Alpha-endosulfan (Endosulfan I)	n/a		0.098	0.1			0.0091	0.0056											
Beta-endosulfan (Endosulfan II)	n/a		0.098	0.1			0.0061	0.0051											
Endosulfan sulfate	3		0.098	0.1			0.059	0.041											
Endrin	0.004		0.098	0.1			0.011	0.0098											
Endrin aldehyde	0.7		0.098	0.1			0.009	0.025											
Heptachlor	0.9		0.098	0.1			0.0083	0.0091											
Heptachlor epoxide	0.9		0.098	0.1			0.013	0.0083											
PCB-1016 (Aroclor 1016)	n/a		0.97	1.0			0.93	1.0											
PCB-1221 (Aroclor 1221)	n/a		0.97	1.0			1.0	1.0											
PCB-1232 (Aroclor 1232)	n/a		0.97	1.0			1.0	1.0											
PCB-1242 (Aroclor 1242)	n/a		0.97	1.0			1.0	1.0											
PCB-1248 (Aroclor 1248)	n/a		0.97	1.0			1.0	1.0											
PCB-1254 (Aroclor 1254)	n/a		0.97	1.0			1.0	0.61											
PCB-1260 (Aroclor 1260)	n/a		0.97	1.0			0.61	0.93											
Toxaphene	0.005		0.98	1.0			1.0	1.0											

Assume a 1:1 total to dissolved ratio  
See previous annual reports to verify values for data prior to 2020-2021 seasons  
\* Recovery of surrogate compounds were low; extraction error at Lab, so no results

## II. Sample Site 2

Site ID: 2 Greenlee		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31																	
Receiving Water: Rillito Wash		Winter	Summer	Winter	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Land Use: Multi-Family Residential		2011-12	2012	2012-13	2013-14	2014	2014-15	2015	2015-16	2016	2016-17 *	2017 *	2017-18 *	2018 *	2018-19 *	2019 *	2019-20	2020	2020-21 *
Sampling Date(s):		3/18/12	7/15/12	1/26/13	11/22/13	8/12/14	12/4/14	10/6/15	1/4/16	7/1/16							1/21/20	7/23/20	
Monitoring Parameters		SWQS																	
<b>Conventional Parameters</b>																			
Flow	n/a	0.1	3.32	1.02	0.19	0.09	0.19	2.67	0.13	6.51							0.32	80	
pH	6.5 - 9	7.97	8.61	6.3	7.09	7.4	6.5	7.3	6								6.5	6.7	
Temperature	n/a	48.7	79.2	62.2	59	82	55	76	52.8								35	76	
Hardness	<400	30	27	16	10	32	11	29	14								1.3	22	
TDS (mg/L)	n/a	160	79	43	24	71	34	42	72								35	82	
TSS (mg/L)	n/a	15	70	24	10	87	10	10	13								10	16	
BOD (mg/L)	n/a	37	16	20	15	15	12	27	14								9.9	32	
COD (mg/L)	n/a	160	89	64	51	110	42	54	36								23	83	
<b>Inorganics</b>																			
Cyanide, total (ug/L)	84	<100	<100	<100	<100	38	82	54	52								36	<36	
<b>Nutrients (mg/L)</b>																			
Nitrate + Nitrite as N	n/a	0.1	0.1	0.10	0.6	0.74	0.5	0.69	0.1									0.57	
Ammonia as N	n/a	0.87	0.5	0.56	1.1	0.72	0.5	0.13	0.5								0.29	0.52	
Total Kjeldahl Nitrogen (TKN)	n/a	2.5	2.2	1.2	1.8	2.8	1	1.2	0.87								0.1	2.1	
Total Phosphorus	n/a	0.32	0.36	0.35	0.1	0.4	0.38	0.35	0.12								0.031	0.3	
Total Orthophosphate	n/a	0.5	0.19	0.50	0.50	0.5	0.50	0.15	0.50								0.18	<0.18	
<b>Microbiological (MPN)</b>																			
Escherichia coli (E. coli)	575	87	2400	770	54	32	2400	870	35								39	2000	
<b>Total Metals (ug/L)</b>																			
Antimony	747	0.5	0.34	0.25	0.3	0.5	0.5	0.26	0.5								0.1	<0.039	
Arsenic	200	40	40	40	40	8	4.5	2.7	40								5.9	<6.7	
Barium	98,000	50	49	50	50	50	50	27	50								5.7	<0.36	
Beryllium	1,867	2.0	2.0	2.0	2.0	2.0	0.93	0.22	2.0								0.33	<0.33	
Cadmium	<3 <sup>Note 1</sup>	2.0	0.4	2.0	2.0	2.0	0.82	0.28	2.0								0.87	<0.87	
Chromium	1,000	30	1.8	30	30	2.8	0.61	0.95	30								3	<3.0	
Copper	<3 <sup>Note 2</sup>	20	19	20	20	23	20	16	20								6.2	<2.0	
Lead	<17 <sup>Note 3</sup>	0.96	2.7	1.4	0.49	3.8	0.5	1.6	0.98								0.33	0.76	
Mercury	5	1.0	1.0	1.0	1.0	0.039	0.11	0.011	0.064								0.041	<0.041	
Nickel	<882 <sup>Note 4</sup>	50	3.0	50	50	2.4	2.2	1.7	2.2								4.7	<4.7	
Selenium	33	2.5	0.26	2.5	0.18	0.39	0.082	0.22	0.056								0.25	<0.25	
Silver	<0.14 <sup>Note 5</sup>	10	0.99	0.014	0.007	0.029	0.049	0.024	0.5								0.000021	<0.000021	
Thallium	75	0.5	0.022	0.5	0.043	0.013	0.013	0.026	0.053								0.03	<0.023	
Zinc	<235 <sup>Note 6</sup>	56	78	40	40	76	40	36	70								2.9	<1.7	

Site ID: 2 Greenlee		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31																	
Receiving Water: Rillito Wash		Winter	Summer	Winter	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Land Use: Multi-Family Residential		2011-12	2012	2012-13	2013-14	2014	2014-15	2015	2015-16	2016	2016-17 *	2017 *	2017-18 *	2018 *	2018-19 *	2019 *	2019-20	2020	2020-21 *
Sampling Date(s):		3/18/12	7/15/12	1/26/13		8/12/14	12/4/14	10/6/15	1/4/16	7/1/16							1/21/20	7/23/20	
SWQS																			
<b>Organic Toxic Pollutants (mg/L)</b>																			
Total Petroleum Hydrocarbons	n/a	5.00	5.00	5.00	5.00	5.00	5.00	5.00	1.38	5.00								1.35	<1.40
Total Oil and Grease	n/a	5.00	5.00	5.00	5.00	5.00	5.00	5.00	0.7	5.00								1.4	<1.40
<b>VOCs, Semi-VOCs, and Pesticides (ug/L)</b>																			
Acrolein	467	10		10			10	2.5											
Acrylonitrile	37,333	10		10			10	2.4											
Benzene	3,733	2.0		2.0			2.0	0.48											
Bromoform	18,667	2.0		2.0			2.0	0.5											
Carbon tetrachloride	1,307	2.0		2.0			2.0	0.35											
Chlorobenzene	18,667	2.0		2.0			2.0	0.37											
Chlorodibromomethane	n/a	2.0		2.0			2.0	0.27											
Chloroethane	n/a	5.0		5.0			5.0	0.45											
2-chloroethyvinyl ether	n/a	2.0		10			10	0.38											
Chloroform	9,333	2.0		2.0			2.0	0.37											
Dichlorobromomethane	n/a	2.0		2.0			2.0	0.33											
1,2-dichlorobenzene	5,900	2.0		2.0			2.0	0.37											
1,3-dichlorobenzene	n/a	2.0		2.0			2.0	0.38											
1,4-dichlorobenzene	6,500	2.0		2.0			2.0	0.36											
1,1-dichloroethane	n/a	2.0		2.0			2.0	0.5											
1,2-dichloroethane	186,667	2.0		2.0			2.0	0.43											
1,1-dichloroethylene	46,667	2.0		2.0			2.0	0.59											
1,2-dichloropropane	84,000	2.0		2.0			2.0	0.45											
1,3-dichloropropylene	n/a	2.0		2.0			4.0	0.78											
Ethylbenzene	93,333	2.0		2.0			2.0	0.31											
Methyl bromide (Bromomethane)	n/a	2.0		2.0			2.0	0.49											
Methyl chloride (Chloromethane)	n/a	5.0		5.0			5.0	0.46											
Methylene chloride	n/a	10		10			10	0.47											
1,1,2,2-tetrachloroethane	93,333	2.0		2.0			2.0	0.4											
Tetrachloroethylene	9,333	2.0		2.0			2.0	0.38											
Toluene	373,333	2.0		2.0			2.0	0.32											
1,2-trans-dichloroethylene	n/a	2.0		2.0			2.0	0.48											
1,1,1-trichloroethane	186,666,667	2.0		2.0			2.0	0.34											
1,1,2-trichloroethane	3,733	2.0		2.0			2.0	0.59											
Trichloroethylene	280	2.0		2.0			2.0	0.47											
Trimethylbenzene	n/a			2.0			4.0	0.71											
Vinyl chloride (chloroethylene)	2,800	2.0		2.0			2.0	0.38											
Xylene	186,667	6.0		6.0			6.0	0.99											

Site ID: 2 Greenlee		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31																	
Receiving Water: Rillito Wash		Winter	Summer	Winter	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Land Use: Multi-Family Residential		2011-12	2012	2012-13	2013-14	2014	2014-15	2015	2015-16	2016	2016-17 *	2017 *	2017-18 *	2018 *	2018-19 *	2019 *	2019-20	2020	2020-21 *
Sampling Date(s):		3/18/12	7/15/12	1/26/13		8/12/14	12/4/14	10/6/15	1/4/16	7/1/16							1/21/20	7/23/20	
SWQS																			
<b>SVOCs - Acid Extractables (ug/L)</b>																			
2-chlorophenol	4,667	9.8		9.9			10	0.77											
2,4-dichlorophenol	2,800	9.8		9.9			10	0.63											
2,4-dimethylphenol	18,667	9.8		9.9			10	0.54											
4,6-dinitro-o-cresol (4,6-Dinitro-2-methylphe	3,733	20		20			21	0.89											
2,4-dinitrophenol	1,867	49		50			51	5											
2-nitrophenol	n/a	9.8		9.9			10	3.6											
4-nitrophenol	n/a	49		50			51	0.54											
p-chloro-m-cresol (4-Chlor-3-methylphenol)	n/a	9.8		9.9			10	0.62											
Pentachlorophenol	<18 <sup>Nov7</sup>	29		30			31	1											
Phenol	180,000	9.8		9.9			10	0.9											
2,4,6-trichlorophenol	130	9.8		9.9			10	0.82											
<b>SVOCs - Bases/Neutrals (ug/L)</b>																			
Acenaphthene	56,000	4.9		5			5.1	0.73											
Acenaphthylene	n/a	4.9		5			5.1	0.62											
Anthracene	280,000	4.9		5			5.1	0.7											
Benzo(a)anthracene	0.2	0.63		5			0.78	0.76											
Benzo(a)pyrene	0.2	0.51		0.75			0.57	0.56											
Benzo(b)fluoranthene	n/a	9.8		1.6			1.3	1.3											
Benzo(g,h,i)perylene	n/a	4.9		5			5.1	1.5											
Benzo(k)fluoranthene	1.9	1.3		1.6			1.3	1.3											
Chrysene	19	4.9		5			5.1	0.67											
Dibenzo(a,h)anthracene	1.9	0.48		0.94			0.93	0.91											
3,3'-dichlorobenzidine	3	1.1		1.0			1.5	1.5											
Diethyl phthalate	746,667	9.8		9.9			10	1.1											
Dimethyl phthalate	n/a	9.8		9.9			10	0.56											
Di-n-butyl phthalate	n/a	9.8		9.9			10	2.7											
2,4-dinitrotoluene	1,867	9.8		9.9			10	1											
2,6-dinitrotoluene	3,733	9.8		9.9			10	1.1											
Di-n-octyl phthalate	373,333	9.8		9.9			10	0.76											
1,2-diphenylhydrazine (as azobenzene)	1.8	9.8		9.9			10	1											
Fluoranthene	37,333	4.9		5			5.1	0.81											
Fluorene	37,333	4.9		5			5.1	0.6											
Hexachlorobenzene	747	9.8		9.9			10	1											
Hexachlorobutadiene	187	9.8		9.9			10	1.1											
Hexachlorocyclopentadiene	11,200	9.8		9.9			10	0.71											
Hexachloroethane	850	9.8		9.9			10	1.4											
Indeno(1,2,3-cd)pyrene	1.9	0.91		0.81			1.2	1.2											
Isophorone	186,667	9.8		9.9			10	0.82											

Site ID: 2 Greenlee		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31																	
Receiving Water: Rillito Wash		Winter	Summer	Winter	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Land Use: Multi-Family Residential		2011-12	2012	2012-13	2013-14	2014	2014-15	2015	2015-16	2016	2016-17 *	2017 *	2017-18 *	2018 *	2018-19 *	2019 *	2019-20	2020	2020-21 *
Sampling Date(s):		3/18/12	7/15/12	1/26/13	11/22/13	8/12/14	12/4/14	10/6/15	1/4/16	7/1/16							1/21/20	7/23/20	
SWQS																			
<b>SVOCs - Bases/Neutrals (ug/L) continued</b>																			
Naphthalene	18,667	4.9		5.0			5.1	0.78											
Nitrobenzene	467	9.8		9.9			10	1.1											
N-nitrosodimethylamine	0.03	0.18		1.6			2.3	2.3											
N-nitrosodi-n-propylamine	88,667	9.8		9.9			10	1.1											
N-nitrosodiphenylamine	n/a	9.8		9.9			10	0.89											
Phenanthrene	n/a	4.9		5.0			5.1	0.63											
Pyrene	28,000	4.9		5.0			5.1	0.57											
1,2,4-trichlorobenzene	9,333	9.8		9.9			10	0.96											
<b>Pesticides (ug/L)</b>																			
Aldrin	<0.003 <sup>Notes</sup>	0.097		0.099			0.1	0.013											
Alpha-BHC	n/a	0.097		0.099			0.1	0.02											
Beta-BHC	n/a	0.097		0.099			0.1	0.01											
Gamma-BHC	n/a	0.097		0.099			0.1	0.04											
Delta-BHC	n/a	0.097		0.099			0.1	0.011											
Chlordane (alpha, gamma)	3.2	0.097		0.099			0.2	0.0137											
4,4'-DDT	n/a	0.097		0.099			0.10	0.0070											
4,4'-DDE	n/a	0.097		0.099			0.10	0.0051											
4,4'-DDD	n/a	0.097		0.099			0.10	0.0099											
Dieldrin	<0.003 <sup>Notes</sup>	0.097		0.099			0.1	0.0084											
Alpha-endosulfan (Endosulfan I)	n/a	0.097		0.099			0.1	0.0057											
Beta-endosulfan (Endosulfan II)	n/a	0.097		0.099			0.1	0.0051											
Endosulfan sulfate	3	0.097		0.099			0.1	0.041											
Endrin	0.004	0.097		0.099			0.1	0.0098											
Endrin aldehyde	0.7	0.097		0.099			0.1	0.026											
Heptachlor	0.9	0.097		0.099			0.1	0.0091											
Heptachlor epoxide	0.9	0.097		0.099			0.1	0.0084											
PCB-1016 (Aroclor 1016)	n/a	0.09		1.0			0.99	0.99											
PCB-1221 (Aroclor 1221)	n/a	0.09		1.0			0.99	0.99											
PCB-1232 (Aroclor 1232)	n/a	0.09		1.0			0.99	0.99											
PCB-1242 (Aroclor 1242)	n/a	0.09		1.0			0.99	0.99											
PCB-1248 (Aroclor 1248)	n/a	0.09		1.0			0.99	0.99											
PCB-1254 (Aroclor 1254)	n/a	0.09		1.0			0.99	0.6											
PCB-1260 (Aroclor 1260)	n/a	0.09		1.0			0.99	0.92											
Toxaphene	0.005	0.99		0.99			1.0	1.0											

Assume a 1:1 total to dissolved ratio  
 See previous annual reports to verify values for data prior to 2020-2021 seasons  
 \* Stormwater sample not taken - see Storm Event Table in Part 8 for additional information

### III. Sample Site 3

Site ID: 3 Randolph/Broadway Receiving Water: Santa Cruz Land Use: Commercial		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31																	
		Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter		
Sampling Date(s):		7/20/12	2/20/13	7/15/13	3/1/14	7/16/14	12/4/14	7/28/15	12/12/15	6/26/16	12/2/16		2/14/18	10/1/18	2018-19 *	2019 *	2019-20	2020	2020-21 *
<b>Monitoring Parameters</b>		<b>SWQS</b>																	
<b>Conventional Parameters</b>																			
Flow	n/a	2.25	1.25	1.15	3.73	5.75	0.8457	1.04	2.63	1.7	0.57		1.7	2.11			2.35	75	
pH	6.5 - 9	8.39	7.5	5	5.5	5.5	6.5	7.5	7.7	7.1	7.5		6.8	7.2			6.5	7.2	
Temperature	n/a	88.3	44.2	86.2	59.4	91.8	55	82.3	55	83.8	40.5		45	72.6			21	76	
Hardness	<400	28	25	48	20	51	21	34	17	35	23		23	28			32	110	
TDS (mg/L)	n/a	92	63	120	40	66	48	95	54	86	42		67	80			100	360	
TSS (mg/L)	n/a	57	59	120	93	100	52	38	29	110	33		80	<10			76	110	
BOD (mg/L)	n/a	100	15	10	10	11	24	21	190	33	12		21	24			18	99	
COD (mg/L)	n/a	110	130	180	110	110	120	160	74	170	63		150	110			150	540	
<b>Inorganics</b>																			
Cyanide, total (ug/L)	84	<100	<100	<38	<38	85	<82	<33	<100	<25	<28		<36	<36			36		
<b>Nutrients (mg/L)</b>																			
Nitrate + Nitrite as N	n/a	<.1	<.1	<.1	<.1	0.57	0.59	0.586	0.6	0.93	0.37		<.0040						
Ammonia as N	n/a	1.3	0.63	1.4	0.58	1.1	0.72	0.58	0.52	1.3	<.094		0.65	0.5			0.74	2.8	
Total Kjeldahl Nitrogen (TKN)	n/a	2.3	1.3	13	1.6	0.63	2	2.9	1.5	3.7	0.37		1.2	2			2.4	9.8	
Total Phosphorus	n/a	0.25	0.16	0.5	0.24	0.23	0.39	0.38	0.16	0.54	0.12		0.28	0.19			0.031	0.88	
Total Orthophosphate	n/a	0.13	0.5	0.5	0.5	0.5	0.5	0.23	0.5	0.5	0.13		0.5				0.18	<0.18	
<b>Microbiological (MPN)</b>																			
Escherichia coli (E. coli)	575	370	580	130	170	1600	610	550	730	2400	210		240	2400			2400	*	
<b>Total Metals (ug/L)</b>																			
Antimony	747	3.5	2	4	3.5	3.9	2	1.9	0.96	2.6	0.96		1.8	1.5			2.7	10	
Arsenic	200	40	40	40	40	8.4	6.1	5.5	3.7	5.7	6.4		40	15			5.9	11	
Barium	98,000	50	57	80	64	60	50	37	50	67	28		50	50			61	100	
Beryllium	1,867	2	2	2	2	0.93	0.93	0.22	2	2	1.3		2	2			0.33	0.65	
Cadmium	<3 <sup>Note 1</sup>	0.44	2	2	2	0.82	0.82	0.29	2	2	1.4		1.3	2			0.87	<0.87	
Chromium	1,000	3.6	30	30	30	3.7	1.8	1.5	1.3	3.5	1.6		30	4.2			3	4.9	
Copper	<3 <sup>Note 2</sup>	34	44	60	60	35	37	49	24	71	22		42	30			45	92	
Lead	<17 <sup>Note 3</sup>	7.9	12	16	20	14	6.4	4.4	3.7	41	4.3		9.8	3.4			22	8.9	
Mercury	5	1	0.032	0.12	0.11	0.058	0.12	0.05	1	1	0.094		1	1			0.19	0.079	
Nickel	<882 <sup>Note 4</sup>	4.8	50	50	50	4.3	3.5	3.4	2.4	1.7	2.2		4.9	50			4.9	11	
Selenium	33	2.5	1.7	0.24	0.14	0.082	0.12	0.24	0.11	0.32	0.42		2.5	2.5			1.1	1.1	
Silver	<0.14 <sup>Note 5</sup>	0.95	0.0054	0.086	0.21	0.12	0.13	0.062	0.5	0.0005	0.08		0.0005	0.0005			0.000021	<0.000021	
Thallium	75	0.018	0.018	0.5	2.5	0.052	0.013	0.11	0.024	0.5	0.028		0.5	0.5			0.072	0.15	
Zinc	<235 <sup>Note 6</sup>	150	190	250	190	120	160	180	100	350	85		190	120			240	550	

Site ID: 3 Randolph/Broadway		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31																	
Receiving Water: Santa Cruz		Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Land Use: Commercial		2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016	2016-17	2017 *	2017-18	2018	2018-19 *	2019 *	2019-20	2020	2020-21 *
Sampling Date(s):		7/20/12	2/20/13	7/15/13	3/1/14	7/16/14	12/4/14	7/28/15	12/12/15	6/26/16	12/2/16		2/14/18	10/1/18			11/19/19	7/11/20	
SWQS																			
<b>Organic Toxic Pollutants (mg/L)</b>																			
Total Petroleum Hydrocarbons	n/a	5	<5.00	<5.00	<5.00	<5	<5	2.7	<5	<5	3.2		0.600	1.4			2.67		
Total Oil and Grease	n/a	5	5.9	5.00	6	0.42	5.00	4	7	5.0	4.9		7.2	4.77			5.82		
<b>VOCs, Semi-VOCs, and Pesticides (ug/L)</b>																			
Acrolein	467		10	10			10	0.76			2.5								
Acrylonitrile	37,333		10	10			10	0.65			2.4								
Benzene	3,733		2.0	2.0			2.0	0.48			0.48								
Bromoform	18,667		2.0	2.0			2.0	0.5			0.5								
Carbon tetrachloride	1,307		2.0	2.0			2.0	0.35			0.35								
Chlorobenzene	18,667		2.0	2.0			2.0	0.37			0.37								
Chlorodibromomethane	n/a		2.0	2.0			2.0	0.27			0.27								
Chloroethane	n/a		5.0	5.0			5.0	0.45			0.45								
2-chloroethylvinyl ether	n/a		10	10			10	0.56			0.38								
Chloroform	9,333		2.0	2.0			2.0	0.37			0.37								
Dichlorobromomethane	n/a		2.0	2.0			2.0	0.33			0.33								
1,2-dichlorobenzene	5,900		2.0	2.0			2.0	0.37			n/a								
1,3-dichlorobenzene	n/a		2.0	2.0			2.0	0.38			n/a								
1,4-dichlorobenzene	6,500		2.0	2.0			2.0	0.36			n/a								
1,1-dichloroethane	n/a		2.0	2.0			2.0	0.5			0.5								
1,2-dichloroethane	186,667		2.0	2.0			2.0	0.43			0.43								
1,1-dichloroethylene	46,667		2.0	2.0			2.0	0.59			0.59								
1,2-dichloropropane	84,000		2.0	2.0			2.0	0.45			0.45								
1,3-dichloropropylene	n/a		2.0	2.0			4.0	0.78			n/a								
Ethylbenzene	93,333		2.0	2.0			2.0	0.31			0.31								
Methyl bromide (Bromomethane)	n/a		2.0	2.0			2.0	0.49			0.49								
Methyl chloride (Chloromethane)	n/a		5.0	5.0			5.0	0.46			0.46								
Methylene chloride	n/a		10	10			10	0.47			0.47								
1,1,2,2-tetrachloroethane	93,333		2.0	2.0			2.0	0.40			0.4								
Tetrachloroethylene	9,333		2.0	2.0			2.0	0.38			0.38								
Toluene	373,333		2.0	2.0			2.0	0.32			0.32								
1,2-trans-dichloroethylene	n/a		2.0	2.0			2.0	0.48			0.48								
1,1,1-trichloroethane	186,666,667		2.0	2.0			2.0	0.34			0.34								
1,1,2-trichloroethane	3,733		2.0	2.0			2.0	0.59			0.59								
Trichloroethylene	280		2.0	2.0			2.0	0.47			0.47								
Trimethylbenzene	n/a		2.0	2.0			4.0	0.71			n/a								
Vinyl chloride (chloroethylene)	2,800		2.0	2.0			2.0	0.38			0.38								
Xylene	186,667		6.0	6.0			6.0	0.99			0.99								

Site ID: 3 Randolph/Broadway		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31																	
Receiving Water: Santa Cruz		Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Land Use: Commercial		2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016	2016-17	2017 *	2017-18	2018	2018-19 *	2019 *	2019-20	2020	2020-21 *
Sampling Date(s):		7/20/12	2/20/13	7/15/13	3/1/14	7/16/14	12/4/14	7/28/15	12/12/15	6/26/16	12/2/16		2/14/18	10/1/18			11/19/19	7/11/20	10/00
SWQS																			
<b>SVOCs - Acid Extractables (ug/L)</b>																			
2-chlorophenol	4,667		20	10			10	0.16			0.76								
2,4-dichlorophenol	2,800		20	10			10	0.16			0.62								
2,4-dimethylphenol	18,667		20	10			10	0.48			0.53								
4,6-dinitro-o-cresol (4,6-Dinitro-2methylphe	3,733		41	21			20	0.24			0.88								
2,4-dinitrophenol	1,867		100	52			50	4			4.9								
2-nitrophenol	n/a		20	10			10	0.16			3.6								
4-nitrophenol	n/a		100	52			50	4			0.53								
p-chloro-m-cresol (4-Chlor-3-methylphenol)	n/a		20	10			10	0.48			0.61								
Pentachlorophenol	<18 <sup>Note7</sup>		3	1.5			3.4	0.32			1								
Phenol	180,000		20	10			10	1.8			0.89								
2,4,6-trichlorophenol	130		20	10			10	0.16			0.81								
<b>SVOCs - Bases/Neutrals (ug/L)</b>																			
Acenaphthene	56,000		10	5.2			5	0.32			0.72								
Acenaphthylene	n/a		10	5.2			5	0.24			0.61								
Anthracene	280,000		10	5.2			5	0.24			0.69								
Benzo(a)anthracene	0.2		1.2	0.63			0.76	2.1			0.75								
Benzo(a)pyrene	0.2		1.5	0.79			0.56	0.16			0.55								
Benzo(b)fluoranthene	n/a		3.3	10			1.3	0.24			1.3								
Benzo(g,h,i)perylene	n/a		10	5.2			5	0.24			1.5								
Benzo(k)fluoranthene	1.9		3.3	1.7			5	0.48			n/a								
Chrysene	19		10	5.2			5	0.16			0.66								
Dibenzo(a,h)anthracene	1.9		1.9	0.98			0.91	0.56			0.9								
3,3'-dichlorobenzidine	3		2	<10			1.5	ND			1.5								
Diethyl phthalate	746,667		20	5.2			10	2.2			1								
Dimethyl phthalate	n/a		20	10			10	0.24			0.55								
Di-n-butyl phthalate	n/a		20	10			10	3.2			2.7								
2,4-dinitrotoluene	1,867		20	10			10	0.16			1								
2,6-dinitrotoluene	3,733		20	10			10	0.4			1.1								
Di-n-octyl phthalate	373,333		20	10			10	0.16			0.75								
1,2-diphenylhydrazine (as azobenzene)	1.8		10	5.2			10	0.48			0.99								
Fluoranthene	37,333		10	5.2			5	0.4			0.8								
Fluorene	37,333		10	5.2			5	0.16			0.59								
Hexachlorobenzene	747		20	10			10	0.24			1								
Hexachlorobutadiene	187		20	10			10	0.4			1.1								
Hexachlorocyclopentadiene	11,200		20	10			10	1.6			0.7								
Hexachloroethane	850		20	10			10	0.16			1.4								
Indeno(1,2,3-cd)pyrene	1.9		1.7	0.85			1.2	0.48			1.2								
Isophorone	186,667		20	10			10	1.6			0.81								

Site ID: 3 Randolph/Broadway		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31																		
Receiving Water: Santa Cruz		Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	
Land Use: Commercial		2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016	2016-17	2017 *	2017-18	2018	2018-19 *	2019 *	2019-20	2020	2020-21 *	
Sampling Date(s):		7/20/12	2/20/13	7/15/13	3/1/14	7/16/14	12/4/14	7/28/15	12/12/15	6/26/16	12/2/16		2/14/18	10/1/18			11/19/19	7/11/20	10/00	
SWQS																				
<b>SVOCs - Bases/Neutrals (ug/L) continued</b>																				
Naphthalene	18,667		10	5.2			5.0	0.16			0.77									
Nitrobenzene	467		20	10			10	0.16			1.1									
N-nitrosodimethylamine	0.03		3.3	1.7			2.3	0.16			2.2									
N-nitrosodi-n-propylamine	88,667		20	10			10	0.24			1.1									
N-nitrosodiphenylamine	n/a		20	10			10	0.24			0.88									
Phenanthrene	n/a		10	5.2			5	0.32			0.62									
Pyrene	28,000		10	5.2			5	1.9			0.56									
1,2,4-trichlorobenzene	9,333		20	10			10	0.24			0.95									
<b>Pesticides (ug/L)</b>																				
Aldrin	<0.003 <sup>None</sup>		0.1	0.1			0.1	0.032			0.013									
Alpha-BHC	n/a		0.1	0.1			0.1	0.0062			0.02									
Beta-BHC	n/a		0.1	0.1			0.1	0.0184			0.0099									
Gamma-BHC	n/a		0.1	0.1			0.1	0.16			0.039									
Delta-BHC	n/a		0.1	0.1			0.1	0.024			0.011									
Chlordane (alpha, gamma)	3.2		0.1	0.1			0.2	0.014			1.0									
4,4'-DDT	n/a		<0.10	<0.10			<0.10	0.29			0.0069									
4,4'-DDE	n/a		<0.10	<0.10			<0.10	0.0166			0.005									
4,4'-DDD	n/a		<0.10	<0.10			<0.10	0.0122			0.0099									
Dieldrin	<0.003 <sup>None</sup>		0.1	0.1			0.1	0.0138			0.0083									
Alpha-endosulfan (Endosulfan I)	n/a		0.1	0.1			0.1	0.0104			0.0056									
Beta-endosulfan (Endosulfan II)	n/a		0.1	0.1			0.1	0.14			0.0051									
Endosulfan sulfate	3		0.1	0.1			0.1	0.0142			0.041									
Endrin	0.004		0.1	0.1			0.1	0.0108			0.0097									
Endrin aldehyde	0.7		0.1	0.1			0.1	0.026			0.025									
Heptachlor	0.9		0.1	0.1			0.1	0.0186			0.0091									
Heptachlor epoxide	0.9		0.1	0.1			0.1	0.0118			0.0083									
PCB-1016 (Aroclor 1016)	n/a		0.98	1.1			1.0	1.0			1.0									
PCB-1221 (Aroclor 1221)	n/a		0.98	1.1			1.0	1.0			1.0									
PCB-1232 (Aroclor 1232)	n/a		0.98	1.1			1.0	1.0			1.0									
PCB-1242 (Aroclor 1242)	n/a		0.98	1.1			1.0	1.0			1.0									
PCB-1248 (Aroclor 1248)	n/a		0.98	1.1			1.0	1.0			1.0									
PCB-1254 (Aroclor 1254)	n/a		0.98	1.1			1.0	0.054			0.61									
PCB-1260 (Aroclor 1260)	n/a		0.98	1.1			1.0	0.068			0.93									
Toxaphene	0.005		0.1	1.0			1.0	0.06			1.0									

Assume a 1:1 total to dissolved ratio  
 See previous annual reports to verify values for data prior to 2020-2021 seasons  
 \* Stormwater sample not taken - see Storm Event Table in Part 8 for additional information

## IV. Sample Site 4

Site ID: 4 17th Street Receiving Water: Santa Cruz Land Use: Industrial		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31																
		Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Sampling Date(s):		2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016	2017	2017-18 *	2018 *	2018-19 *	2019 *	2019-20	2020 *	2020-21
Monitoring Parameters		7/15/12	2/20/13	9/6/13	3/1/14	7/5/14	12/13/14	6/9/15	1/4/16	7/26/16	8/3/17					12/9/19		12/10/20
SWQS																		
<b>Conventional Parameters</b>																		
Flow	n/a	1.89	0.9	2.43	2.43	0.54	3.08	0.87	4.14	4.53	2.43					0.54		415
pH	6.5 - 9	7.78	7.7	6	6.5	7.2	7.03	7.7	8	7.5	7.3					6.5		7.1
Temperature (F)	n/a	74.7	44	93.5	59	82	58	75	55	46.22	39					35.4		65
Hardness	<400	76	180	390	280	170	42	51	74	110	68					110		88
TDS (mg/L)	n/a	44	130	170	100	490	64	180	72	56	94					65		210
TSS (mg/L)	n/a	200	590	1100	650	300	77	46	180	490	300					340		850
BOD (mg/L)	n/a	14	26	25	13	23	25	33	24	14	6.5					26		29
COD (mg/L)	n/a	140	370	420	230	660	76	230	140	250	130					170		240
<b>Inorganics</b>																		
Cyanide, total (ug/L)	84	<100	<100	<38	<38	65	<82	90	43	59	<28					36		<67
<b>Nutrients (mg/L)</b>																		
Nitrate + Nitrite as N	n/a	<0.10	<0.10	1	0.62	3.5	0.61	0.86	0.93	0.85	0.89							1.297
Ammonia as N	n/a	0.74	0.99	0.96	0.81	3.2	<0.083	1.5	<0.50	0.78	0.58					0.4		2.2
Total Kjeldahl Nitrogen (TKN)	n/a	1.7	2.4	4.3	2.2	17	1.6	4.5	1.8	3.1	2.7					2.1		6.2
Total Phosphorus	n/a	0.39	0.5	2.6	0.75	1.3	0.25	0.43	0.26	0.51	0.36					0.12		0.4
Total Orthophosphate	n/a	0.12	0.5	0.5	0.5	0.22	0.22	0.49	0.5	0.5	0.13					0.18		<0.18
<b>Microbiological (MPN)</b>																		
Escherichia coli (E. coli)	575	2400	54	2400	1000	2400	2400	2400	2400	920	2400					2400		>2400
<b>Total Metals (ug/L)</b>																		
Antimony	747	1.2	2.5	1.9	0.97	4	1.3	2.1	1.1	1.5	2					2.2		1.4
Arsenic	200	6.1	40	4	23	12	7.7	3.5	8.5	7.1	13					12		9.0
Barium	98,000	100	270	450	280	190	45	52	91	160	100					120		95
Beryllium	1,867	<2.0	<2.0	0.17	2	0.93	0.93	0.22	<2.0	<2.0	<0.33					0.33		<0.33
Cadmium	<3 <sup>Note 1</sup>	0.5	<2.0	0.16	0.16	0.82	0.82	0.28	<2.0	<2.0	<0.87					0.87		<0.87
Chromium	1,000	5.5	30	0.35	15	11	3.5	2.3	4.9	9.9	3.9					6.6		5.3
Copper	<3 <sup>Note 2</sup>	67	160	340	130	190	24	43	50	84	47					51		69
Lead	<17 <sup>Note 3</sup>	19	42	80	51	20	7.6	5.7	14	33	17					18		15
Mercury	5	1	0.032	0.16	0.31	0.039	0.081	0.011	0.065	0.23	0.079					0.041		<0.36
Nickel	<882 <sup>Note 4</sup>	6	50	4.1	14	6.3	2.6	6.5	5	8.5	5.2					6.4		9.0
Selenium	33	0.32	1.9	0.44	0.082	1.7	0.082	0.35	0.28	<2.5	0.65					0.25		0.30
Silver	<0.14 <sup>Note 5</sup>	0.85	0.24	1	0.51	0.029	0.19	0.033	0.5	0.0005	0.000092					0.000021		ND
Thallium	75	0.063	0.1	0.18	0.16	0.013	0.022	0.019	0.082	0.07	0.068					0.044		0.11
Zinc	<235 <sup>Note 6</sup>	220	440	800	330	690	110	350	220	430	190					210		310

Site ID: 4 17th Street		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31																
Receiving Water: Santa Cruz		Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	
Land Use: Industrial		2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016	2017	2017-18 *	2018 *	2018-19 *	2019 *	2019-20	2020 *	2020-21
Sampling Date(s):		7/15/12	2/20/13	9/6/13	3/1/14	7/5/14	12/13/14	6/9/15	1/4/16	7/26/16	8/3/17					12/9/19	12/10/20	
SWQS																		
<b>Organic Toxic Pollutants (mg/L)</b>																		
Total Petroleum Hydrocarbons	n/a	5	5	6.1	5	5	2.7	3.8	8.3	6.5	1.5					4.75		3.89
Total Oil and Grease	n/a	11.5	8.5	40.5	8.4	5	5.8	14.8	10.7	8.7	4.6					6.77		6.27
<b>VOCs, Semi-VOCs, and Pesticides (ug/L)</b>																		
Acrolein	467		10	10			0.76	2.5			0.76							<10
Acrylonitrile	37,333		10	10			0.65	2.4			0.65							<10
Benzene	3,733		2	2			0.25	0.48			0.48							<2.0
Bromoform	18,667		2	2			0.33	0.5			0.5							<2.0
Carbon tetrachloride	1,307		2	2			0.18	0.35			0.35							**
Chlorobenzene	18,667		2	2			0.24	0.37			0.37							<2.0
Chlorodibromomethane	n/a		2	2			0.21	0.27			0.27							<2.0
Chloroethane	n/a		5	5			0.17	0.44			0.45							<5.0
2-chloroethylvinyl ether	n/a		10	10			0.56	0.38			0.56							<10
Chloroform	9,333		2	2			0.19	0.37			0.37							<2.0
Dichlorobromomethane	n/a		2	2			0.2	0.33										<2.0
1,2-dichlorobenzene	5,900		2	20			0.49	0.37			0.37							<2.0
1,3-dichlorobenzene	n/a		2	20			0.35	0.38			0.38							<2.0
1,4-dichlorobenzene	6,500		2	20			0.41	0.36			0.36							<2.0
1,1-dichloroethane	n/a		2	2			0.17	0.5			0.5							<2.0
1,2-dichloroethane	186,667		2	2			0.21	0.43			0.43							<2.0
1,1-dichloroethylene	46,667		2	2			0.28	0.59										<2.0
1,2-dichloropropane	84,000		2	2			2	0.45			0.45							<2.0
1,3-dichloropropylene	n/a		4	4			0.3	0.78										<2.0
Ethylbenzene	93,333		2	2			0.24	0.31			0.31							<2.0
Methyl bromide (Bromomethane)	n/a		2	2			0.21	0.49			0.49							<2.0
Methyl chloride (Chloromethane)	n/a		5	5			0.28	0.46			0.46							<5.0
Methylene chloride	n/a		10	10			0.28	0.47			0.47							<10
1,1,2,2-tetrachloroethane	93,333		2	2			0.5	0.4			0.4							<2.0
Tetrachloroethylene	9,333		2	2			0.29	0.38										<2.0
Toluene	373,333		2	2			0.22	0.32			0.32							<2.0
1,2-trans-dichloroethylene	n/a		2	2			0.23	0.48										<2.0
1,1,1-trichloroethane	186,666,667		2	2			0.23	0.34			0.34							<2.0
1,1,2-trichloroethane	3,733		2	2			0.32	0.59			0.59							<2.0
Trichloroethylene	280		2	2			0.19	0.47										<2.0
Trimethylbenzene	n/a		2	2			2	0.74										<2.0
Vinyl chloride (chloroethylene)	2,800		2	2			0.32	0.38			0.38							<2.0
Xylene	186,667		6	6			0.63	0.99			0.99							<6.0

Site ID: 4 17th Street		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31																
Receiving Water: Santa Cruz		Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Summer	Winter	Summer	Winter	Summer	Winter		
Land Use: Industrial		2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016	2017	2017-18 *	2018 *	2018-19 *	2019 *	2019-20	2020 *	2020-21
Sampling Date(s):		7/15/12	2/20/13	9/6/13	3/1/14	7/5/14	12/13/14	6/9/15	1/4/16	7/26/16	8/3/17					12/9/19		12/10/20
SWQS																		
<b>SVOCs - Acid Extractables (ug/L)</b>																		
2-chlorophenol	4,667		20	20			0.77	3.1			76							<0.0100
2,4-dichlorophenol	2,800		20	20			0.63	2.5			62							<0.0100
2,4-dimethylphenol	18,667		20	20			0.54	2.1			53							<0.0100
4,6-dinitro-o-cresol(4,6-Dinitro-2methylp	3,733		39	40			0.89	3.5			88							<0.0100
2,4-dinitrophenol	1,867		98	100			5	20			490							<0.0100
2-nitrophenol	n/a		20	20			3.6	14			360							<0.0100
4-nitrophenol	n/a		98	100			0.54	2.1			53							<0.0100
p-chloro-m-cresol (4-Chlor-3-methylphenol)	n/a		20	20			0.62	2.5			61							<0.0100
Pentachlorophenol	<18 <sup>None7</sup>		2.9	3			3.4	4			100							<0.0100
Phenol	180,000		20	20			0.9	3.6			89							<0.0100
2,4,6-trichlorophenol	130		20	20			0.82	3.3			81							<0.0100
<b>SVOCs - Bases/Neutrals (ug/L)</b>																		
Acenaphthene	56,000		9.8	10			0.73	2.9			72							<0.0100
Acenaphthylene	n/a		9.8	10			0.62	2.5			61							<0.0100
Anthracene	280,000		9.8	10			0.7	2.8			69							<0.0100
Benzo(a)anthracene	0.2		1.2	1.2			0.76	3			75							<0.0100
Benzo(a)pyrene	0.2		1.5	15			0.56	2.2			55							<0.0100
Benzo(b)fluoranthene	n/a		3.2	3.3			1.3	5			130							<0.0100
Benzo(g,h,i)perylene	n/a		9.8	10			1.5	6.2			150							<0.0100
Benzo(k)fluoranthene	1.9		3.2	3.3			1.3	5			130							<0.0100
Chrysene	19		9.8	10			0.67	2.7			66							<0.0100
Dibenzo(a,h)anthracene	1.9		1.9	1.9			0.91	3.6			90							<0.0100
3,3'-dichlorobenzidine	3		<2.0	<2.0			<1.5	<5.9			<150							<0.100
Diethyl phthalate	746,667		20	20			1.1	4.2			100							<0.00300
Dimethyl phthalate	n/a		20	20			0.56	2.2			55							<0.00300
Di-n-butyl phthalate	n/a		20	20			2.7	11			270							<0.00300
2,4-dinitrotoluene	1,867		20	20			1	4.1			100							<0.0100
2,6-dinitrotoluene	3,733		20	20			1.1	4.3			110							<0.0100
Di-n-octyl phthalate	373,333		20	20			0.76	3			75							<0.00300
1,2-diphenylhydrazine (as azobenzene)	1.8		4.9	20			1	4			99							
Fluoranthene	37,333		9.8	10			0.81	3.2			80							<0.00100
Fluorene	37,333		9.8	10			0.6	2.4			59							<0.00100
Hexachlorobenzene	747		20	20			1	4.2			100							<0.00100
Hexachlorobutadiene	187		20	20			1.1	4.5			110							<0.0100
Hexachlorocyclopentadiene	11,200		20	20			0.71	2.8			70							<0.0100
Hexachloroethane	850		20	20			1.4	5.7			140							<0.0100
Indeno(1,2,3-cd)pyrene	1.9		1.6	1.6			1.2	4.7			120							<0.00100
Isophorone	186,667		20	20			0.82	3.3			81							<0.0100

Site ID: 4 17th Street		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31																
Receiving Water: Santa Cruz		Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	
Land Use: Industrial		2012	2012-13	2013	2013-14	2014	2014-15	2015	2015-16	2016	2017	2017-18 *	2018 *	2018-19 *	2019 *	2019-20	2020 *	2020-21
Sampling Date(s):		7/15/12	2/20/13	9/6/13	3/1/14	7/5/14	12/13/14	6/9/15	1/4/16	7/26/16	8/3/17					12/9/19		12/10/20
SWQS																		
<b>SVOCs - Bases/Neutrals (ug/L) continued</b>																		
Naphthalene	18,667		9.8	10			0.78	3.1			77							<0.00100
Nitrobenzene	467		20	20			1.1	4.3			110							<0.0100
N-nitrosodimethylamine	0.03		3.2	3.2			2.3	9			220							<0.0100
N-nitrosodi-n-propylamine	88,667		20	20			1.1	4.4			110							<0.0100
N-nitrosodiphenylamine	n/a		20	20			0.89	3.5			88							<0.0100
Phenanthrene	n/a		9.8	10			0.63	2.5			62							<0.00100
Pyrene	28,000		9.8	10			0.57	2.3			56							<0.00100
1,2,4-trichlorobenzene	9,333		20	20			0.96	3.8			95							<0.0100
<b>Pesticides (ug/L)</b>																		
Aldrin	<0.003 <sup>Nines</sup>		0.099	0.099			0.016	0.013			0.013							<0.0000500
Alpha-BHC	n/a		0.099	0.099			0.0099	0.02			0.02							<0.0000500
Beta-BHC	n/a		0.099	0.099			0.017	0.0097			0.0099							<0.0000500
Gamma-BHC	n/a		0.099	0.099			0.023	0.039			0.039							<0.0000500
Delta-BHC	n/a		0.099	0.099			0.012	0.01			0.011							<0.0000500
Chlordane (alpha, gamma)	3.2		0.099	0.099			0.0077	0.0134			0.0059							<0.00500
4,4'-DDT	n/a		<0.099	<0.099			<0.014	<0.0068			<0.0078							<0.0000500
4,4'-DDE	n/a		<0.099	<0.099			<0.0099	<0.0050			<0.0070							<0.0000500
4,4'-DDD	n/a		<0.099	<0.099			<0.0099	<0.0097			<0.0051							<0.0000500
Dieldrin	<0.003 <sup>Nines</sup>		0.099	0.099			0.0083	0.0082			0.0099							0.0000526
Alpha-endosulfan (Endosulfan I)	n/a		0.099	0.099			0.009	0.0055			0.0084							<0.0000500
Beta-endosulfan (Endosulfan II)	n/a		0.099	0.099			0.0061	0.005			0.0057							<0.0000500
Endosulfan sulfate	3		0.099	0.099			0.059	0.04			0.0051							<0.0000500
Endrin	0.004		0.099	0.099			0.011	0.0096			0.041							<0.000500
Endrin aldehyde	0.7		0.099	0.099			0.0089	0.025			0.0098							<0.000500
Heptachlor	0.9		0.099	0.099			0.0082	0.0089			0.025							<0.000500
Heptachlor epoxide	0.9		0.099	0.099			0.013	0.0082			0.0091							<0.000500
PCB-1016 (Aroclor 1016)	n/a		<1.0	<1.0			0.99	0.99			0.0084							**
PCB-1221 (Aroclor 1221)	n/a		<1.0	<1.0			0.99	0.99			<1.0							<0.000500
PCB-1232 (Aroclor 1232)	n/a		<1.0	<1.0			0.99	0.99			<1.0							<0.000500
PCB-1242 (Aroclor 1242)	n/a		<1.0	<1.0			0.99	0.99			<1.0							<0.000500
PCB-1248 (Aroclor 1248)	n/a		<1.0	<1.0			0.99	0.99			<1.0							<0.000500
PCB-1254 (Aroclor 1254)	n/a		<1.0	<1.0			0.61	0.61			<1.0							<0.000500
PCB-1260 (Aroclor 1260)	n/a		<1.0	<1.0			0.92	0.92			0.61							**
Toxaphene	0.005		0.99	0.99			0.99	0.98			0.93							<0.000500

Assume a 1:1 total to dissolved ratio

See previous annual reports to verify values for data prior to 2020-2021 seasons

\* Stormwater sample not taken - see Storm Event Table in Part 8 for additional information

\*\* Matrix spike recovery was high, target analyte not detected in sample

## V. Sample Site 5

Site ID: 5 Limberlost/1st Av		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31															
Receiving Water: Rillito Wash		Winter	Summer	Winter	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Land Use: Mixed		2011-12	2012	2012-13	2013-14	2014	2014-15	2015	2015-16	2016	2016-17	2018	2018-19 *	2019 *	2019-20	2020	2020-21 *
Sampling Date(s):		2/14/12	7/10/12	1/26/13	12/20/13	7/3/14	12/4/14	6/9/15	12/12/15	6/26/16	12/17/16	6/16/18			2/10/20	7/23/20	
Monitoring Parameters		SWQS															
<b>Conventional Parameters</b>																	
Flow	n/a	1.07	10.19	6.52	4.2	3.34	7.75	1.54	5.45	3.11	0.8	3.43			1.63	72	
pH	6.5 - 9	7.75	8.25	6.5	7.67	7	6	7.7	5.5	8.2	8.2	7.3			6.5	7.1	
Temperature	n/a	52.7	85.3	66	53	82	55*	78.3	55	81.3	57.1	47			40.6	82	
Hardness	<400	100	92	28	30	130	34	88	27	170	65	72			56	87	
TDS (mg/L)	n/a	300	120	49	83	330	27	210	64	94	96	160			98	230	
TSS (mg/L)	n/a	170	500	160	92	260	110	130	80	1200	220	110			370	290	
BOD (mg/L)	n/a	100	27	17	14	21	31	40	200	35	46	31			19	89	
COD (mg/L)	n/a	470	260	130	120	540	120	300	110	240	190	250			350	350	
<b>Inorganics</b>																	
Cyanide, total (ug/L)	84	<100	100	<100	<38	53	<82	96	<100	<100	<28	<36				<36	
<b>Nutrients (mg/L)</b>																	
Nitrate + Nitrite as N	n/a	2	1.1	0.1	1.1	1.8	0.79	0.72	0.93	0.84	1	0.91				1.4	
Ammonia as N	n/a	3.7	1.1	0.5	1.5	3.3	0.5	0.58	0.63	0.54	1.1	0.94			0.72	2	
Total Kjeldahl Nitrogen (TKN)	n/a	8.8	19	0.97	2.6	13	2.1	4	2.3	4.6	2.3	5.5			2.7	7.4	
Total Phosphorus	n/a	0.69	0.9	0.55	0.32	1.1	0.48	0.54	0.27	2.5	0.61	0.66			0.45	0.9	
Total Orthophosphate	n/a	0.5	0.16	0.5	0.5	0.22	0.5	0.27	0.5	2.5	0.18	0.056			0.18	<0.18	
<b>Microbiological (MPN)</b>																	
Escherichia coli (E. coli)	575	93	>2400	>2400		210	580	>2400	>2400	2000	>2400	1400			770	820	
<b>Total Metals (ug/L)</b>																	
Antimony	747	<0.2	2.2	0.99		1.3	4	2.1	4.5	1.1	1.4	3.6			2.8	2.1	
Arsenic	200	<40	7.3	<40		<4.0	8.4	6.9	8.5	2.9	6.9	10			12	11	
Barium	98,000	130	180	<50		60	150	70	89	62	90	89			140	140	
Beryllium	1,867	<2.0	<2.0	<2.0		<0.17	<0.93	<0.93	<0.22	<2.0	1.3	0.33			0.33	<0.33	
Cadmium	<3 <sup>Note 1</sup>	<2.0	<2.0	<2.0		<0.16	<0.82	<0.82	<0.28	<2.0	1.4	0.87			0.87	<0.87	
Chromium	1,000	<30	12	<30		<0.35	8.1	3.4	5	3.2	5.5	3			7	7.5	
Copper	<3 <sup>Note 2</sup>	99	97	22		33	130	38	61	38	47	71			80	83	
Lead	<17 <sup>Note 3</sup>	<0.04	40	12		7.4	20	12	11	8.7	15	14			27	20	
Mercury	5	<1.0	<1.0	0.04		<0.049	0.056	0.12	<0.011	<1.0	0.094	5			0.041	<0.041	
Nickel	<882 <sup>Note 4</sup>	<50	13	<50		<4.1	7.4	6	7	4.8	5.7	4.7			9.1	14	
Selenium	33	<0.04	0.36	0.36		0.21	1	0.24	0.37	0.25	0.33	0.48			0.58	<0.25	
Silver	<0.14 <sup>Note 5</sup>	<10	<10	0.013		0.11	<0.029	0.15	0.098	<0.50	0.099	0.049			0.00015	<0.000021	
Thallium	75	<0.05	0.04	<0.5		0.048	<0.013	0.1	0.04	0.05	0.11	0.031			0.24	0.090	
Zinc	<235 <sup>Note 6</sup>	720	420	210		260	1000	240	220	210	310	630			420	480	

Site ID: 5 Limberlost/1 st Av		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31															
Receiving Water: Rillito Wash		Winter	Summer	Winter	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Land Use: Mixed		2011-12	2012	2012-13	2013-14	2014	2014-15	2015	2015-16	2016	2016-17	2018	2018-19 *	2019 *	2019-20	2020	2020-21 *
Sampling Date(s):		2/14/12	7/10/12	1/26/13	12/20/13	7/3/14	12/4/14	6/9/15	12/12/15	6/26/16	12/17/16	6/16/18			2/10/20	7/23/20	1/0/00
SWQS																	
<b>Organic Toxic Pollutants (mg/L)</b>																	
Total Petroleum Hydrocarbons	n/a	8.9	<5.00	<5.00	<5.00	<5.00	<5.00	1.8	<5.00	<5.00	0.9	ND				<1.41	
Total Oil and Grease	n/a	10.6	13	6.2	7	5.6	5	2.8	5.3	6.1	2.7	ND			9.65	<1.40	
<b>VOCs, Semi-VOCs, and Pesticides (ug/L)</b>																	
Acrolein	467	50		50			10	13			0.76						
Acrylonitrile	37,333	50		50			10	12			0.65						
Benzene	3,733	10		10			2.0	2.4			0.48						
Bromoform	18,667	10		10			2.0	2.5			0.5						
Carbon tetrachloride	1,307	10		10			2.0	1.7			0.35						
Chlorobenzene	18,667	10		10			2.0	1.8			0.37						
Chlorodibromomethane	n/a	10		10			2.0	1.4			0.27						
Chloroethane	n/a	25		25			5.0	2.2			0.45						
2-chloroethylvinyl ether	n/a	50		50			10	1.9			0.56						
Chloroform	9,333	10		10			2.0	1.9			0.37						
Dichlorobromomethane	n/a	10		10			2.0	1.7			0.33						
1,2-dichlorobenzene	5,900	10		10			2.0	1.8			0.37						
1,3-dichlorobenzene	n/a	10		10			2.0	1.9			0.38						
1,4-dichlorobenzene	6,500	10		10			2.0	1.8			0.36						
1,1-dichloroethane	n/a	10		10			2.0	2.5			0.5						
1,2-dichloroethane	186,667	10		10			2.0	2.1			0.43						
1,1-dichloroethylene	46,667	10		10			2.0	2.9			0.47						
1,2-dichloropropane	84,000	10		10			2.0	2.3			0.45						
1,3-dichloropropylene	n/a	10		10			4.0	3.8			n/a						
Ethylbenzene	93,333	10		10			2.0	1.6			0.31						
Methyl bromide (Bromomethane)	n/a	10		10			2.0	2.5			0.49						
Methyl chloride (Chloromethane)	n/a	25		25			5.0	2.3			0.46						
Methylene chloride	n/a	50		50			10	2.4			0.47						
1,1,2,2-tetrachloroethane	93,333	10		10			2.0	2.0			0.4						
Tetrachloroethylene	9,333	10		10			2.0	1.9			0.38						
Toluene	373,333	10		10			2.0	1.6			0.32						
1,2-trans-dichloroethylene	n/a	10		10			2.0	2.4			0.43						
1,1,1-trichloroethane	186,666,667	10		10			2.0	1.7			0.34						
1,1,2-trichloroethane	3,733	10		10			2.0	3.0			0.59						
Trichloroethylene	280	10		10			2.0	2.3			0.47						
Trimethylbenzene	n/a			10			4.0	3.6			<0.33						
Vinyl chloride (chloroethylene)	2,800	10		10			2.0	1.9			0.38						
Xylene	186,667	30		30			6.0	5.0			0.99						

Site ID: 5 Limberlost/1 st Av		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31															
Receiving Water: Rillito Wash		Winter	Summer	Winter	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Land Use: Mixed		2011-12	2012	2012-13	2013-14	2014	2014-15	2015	2015-16	2016	2016-17	2018	2018-19 *	2019 *	2019-20	2020	2020-21 *
Sampling Date(s):		2/14/12	7/10/12	1/26/13	12/20/13	7/3/14	12/4/14	6/9/15	12/12/15	6/26/16	12/17/16	6/16/18			2/10/20	7/23/20	10/00
SWQS																	
<b>SVOCs - Acid Extractables (ug/L)</b>																	
2-chlorophenol	4,667	9.9		10			9.9	3.1			28						
2,4-dichlorophenol	2,800	9.9		10			9.9	2.5			20						
2,4-dimethylphenol	18,667	9.9		10			9.9	2.2			20						
4,6-dinitro-o-cresol(4,6-Dinitro-2methylp	3,733	9.9		20			20	3.6			20						
2,4-dinitrophenol	1,867	49		50			49	20			20						
2-nitrophenol	n/a	9.9		10			9.9	14			20						
4-nitrophenol	n/a	49		50			49	2.2			20						
p-chloro-m-cresol (4-Chlor-3-methylphenol)	n/a	9.9		10			9.9	2.5			36						
Pentachlorophenol	<18 <sup>Not67</sup>	30		30			3.4	4.0			96						
Phenol	180,000	9.9		10			9.9	3.6			20						
2,4,6-trichlorophenol	130	9.9		10			9.9	3.3			20						
<b>SVOCs - Bases/Neutrals (ug/L)</b>																	
Acenaphthene	56,000			5			4.9	2.9			20						
Acenaphthylene	n/a	4.9		5			4.9	2.5			20						
Anthracene	280,000	4.9		5			4.9	2.8			20						
Benzo(a)anthracene	0.2	0.64		0.61			0.75	3.0			20						
Benzo(a)pyrene	0.2	4.9		0.76			0.55	2.2			20						
Benzo(b)fluoranthene	n/a	1.3		1.6			1.3	5.1			20						
Benzo(g,h,i)perylene	n/a	4.9		5.0			4.9	6.2			20						
Benzo(k)fluoranthene	1.9	1.3		1.6			1.3	5.1			20						
Chrysene	19	4.9		5.0			4.9	2.7			20						
Dibenzo(a,h)anthracene	1.9	0.37		0.95			4.9	3.6			20						
3,3'-dichlorobenzidine	3	1.1		1.0			1.5	6.0			n/a						
Diethyl phthalate	746,667	9.9		10			9.9	4.2			20						
Dimethyl phthalate	n/a	9.9		10			9.9	2.2			20						
Di-n-butyl phthalate	n/a	9.9		10			12	11			20						
2,4-dinitrotoluene	1,867	9.9		10			9.9	4.2			20						
2,6-dinitrotoluene	3,733	9.9		10			9.9	4.4			20						
Di-n-octyl phthalate	373,333	9.9		10			9.9	3.0			20						
1,2-diphenylhydrazine (as azobenzene)	1.8	9.9		10			9.9	4.0			n/a						
Fluoranthene	37,333	4.9		5			4.9	3.2			20						
Fluorene	37,333	4.9		5			4.9	2.4			20						
Hexachlorobenzene	747	9.9		10			9.9	4.2			20						
Hexachlorobutadiene	187	9.9		10			9.9	4.5			20						
Hexachlorocyclopentadiene	11,200	9.9		10			9.9	2.8			20						
Hexachloroethane	850	9.9		10			9.9	5.8			20						
Indeno(1,2,3-cd)pyrene	1.9	0.7		0.82			1.2	4.8			20						
Isophorone	186,667	9.9		10			9.9	3.3			20						

Site ID: 5 Limberlost/1 st Av		Monitoring Season Summer: June 1 - October 31, Winter: November 1 - May 31															
Receiving Water: Rillito Wash		Winter	Summer	Winter	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter	Summer	Winter
Land Use: Mixed		2011-12	2012	2012-13	2013-14	2014	2014-15	2015	2015-16	2016	2016-17	2018	2018-19 *	2019 *	2019-20	2020	2020-21 *
Sampling Date(s):		2/14/12	7/10/12	1/26/13	12/20/13	7/3/14	12/4/14	6/9/15	12/12/15	6/26/16	12/17/16	6/16/18			2/10/20	7/23/20	10/00
SWQS																	
<b>SVOCs - Bases/Neutrals (ug/L) continued</b>																	
Naphthalene	18,667	<4.9		<5.0			<4.9	<3.1			<20						
Nitrobenzene	467	<9.9		<10			<9.9	<4.3			<20						
N-nitrosodimethylamine	0.03	<0.18		<1.6			<2.2	<9.1			<20						
N-nitrosodi-n-propylamine	88,667	<9.9		<10			<9.9	<4.4			<20						
N-nitrosodiphenylamine	n/a	<9.9		<10			<9.9	<3.6			<20						
Phenanthrene	n/a	<4.9		<5.0			<4.9	<2.5			<20						
Pyrene	28,000	<4.9		<5.0			<4.9	<2.3			20						
1,2,4-trichlorobenzene	9,333	<9.9		<10			<9.9	<3.8			<20						
<b>Pesticides (ug/L)</b>																	
Aldrin	<0.003 <sup>Non8</sup>	<0.099		<0.10			<0.10	<0.013			<0.138						
Alpha-BHC	n/a	<0.099		<0.10			<0.10	<0.020			<0.106						
Beta-BHC	n/a	<0.099		<0.10			<0.10	<0.0098			<0.134						
Gamma-BHC	n/a	<0.099		<0.10			<0.10	<0.039			<0.124						
Delta-BHC	n/a	<0.099		<0.10			<0.10	<0.010			<0.096						
Chlordane (alpha, gamma)	3.2	<0.099		<0.10			<0.20	<0.0134			<0.140						
4,4'-DDT	n/a	<0.099		<0.10			<0.10	<0.0069			<0.380						
4,4'-DDE	n/a	<0.099		<0.10			<0.10	<0.0050			<0.166						
4,4'-DDD	n/a	<0.099		<0.10			<0.10	<0.0098			<0.176						
Dieldrin	<0.003 <sup>Non8</sup>	<0.099		<0.10			<0.10	<0.0083			<0.178						
Alpha-endosulfan (Endosulfan I)	n/a	<0.099		<0.10			<0.10	<0.0056			<0.140						
Beta-endosulfan (Endosulfan II)	n/a	<0.099		<0.10			<0.10	<0.0050			<0.166						
Endosulfan sulfate	3	<0.099		<0.10			<0.10	<0.040			<0.146						
Endrin	0.004	<0.099		<0.10			<0.10	<0.0097			<0.180						
Endrin aldehyde	0.7	<0.099		<0.10			<0.10	<0.025			<0.124						
Heptachlor	0.9	<0.099		<0.10			<0.10	<0.0090			<0.120						
Heptachlor epoxide	0.9	<0.099		<0.10			<0.10	<0.0083			<0.148						
PCB-1016 (Aroclor 1016)	n/a	<0.99		<1.0			<0.98	<0.98			<0.340						
PCB-1221 (Aroclor 1221)	n/a	<0.99		<1.0			<0.98	<0.98			<5.0						
PCB-1232 (Aroclor 1232)	n/a	<0.99		<1.0			<0.98	<0.98			<5.0						
PCB-1242 (Aroclor 1242)	n/a	<0.99		<1.0			<0.98	<0.98			<5.0						
PCB-1248 (Aroclor 1248)	n/a	<0.99		<1.0			<0.98	<0.98			<5.0						
PCB-1254 (Aroclor 1254)	n/a	<0.99		<1.0			<0.98	<0.60			<5.0						
PCB-1260 (Aroclor 1260)	n/a	<0.99		<1.0			<0.98	<0.91			<0.27						
Toxaphene	0.005	<0.99		<1.0			<1.0	<0.99			<0.6						

Assume a 1:1 total to dissolved ratio

See previous annual reports to verify values for data prior to 2020-2021 seasons

\* Stormwater sample not taken - see Storm Event Table in Part 8 for additional information

## PART 10 ASSESSMENT OF MONITORING DATA

### I. Stormwater Quality

This report is the tenth of a five year permit. Although there was limited opportunity for sampling due to equipment failure and changes to staffing during fiscal year 2020-2021, the sampling results are similar to those submitted last year and in the last permitting term. Sampled stormwater exhibited typical constituent concentrations for stormwater runoff from an arid or semi-arid southwestern city. This fiscal year's samples were well within the historical range of sampling data collected in earlier permit reporting periods. Sample Site 4's value for copper concentration remains normalized during the last two sampling events.

### II. Water Quality Standards (WQS)

The surface water quality standards are discussed below with a summary of the constituents SWQS that vary with hardness or pH at each of the sampling sites. All sites were well below the surface water quality standards excluding those listed and discussed below.

Copper and *Escherichia coli* (*E. coli*) exceed SWQS repeatedly at some of the sites. See exceedance discussion in section III below.

Copper value for the reporting period at Site 1 was the second highest value over the last 10 years [Cu: 66 µg/L] exceeded by value in summer 2014 [Cu: 110 µg/L]. *E. coli* exceeded SWQS at Site 1 and had value above testing limit (>2,400). The upstream watershed use for Site 1 is single family residential (SFR).

Copper did not exceed SWQS during this reporting period. However, *E. coli* level was 2,000 at Site 2 between for this reporting period. The watershed for Site 2 is multi-family residential.

Copper and *E. coli* exceeds SWQS at Site 3. The concentration of copper collected at Site 3, while still above the Surface Water Quality Standard, shows the highest value this reporting period than previous 10 years. Site 3's stormwater flows from a commercial watershed in a shopping mall area.

Copper and *E. coli* exceeded SWQS repeatedly at Site 4. Site 4's storm-water flows through an industrial watershed where the possible sources of copper may exist. Stormwater Inspectors check this area periodically. During the winter 2020, a sample on 11DEC20 from Site 4 showed *E. coli* / coliforms levels were lower than expected but still high. Low numbers for analytes and *E. coli* / coliforms may be due to high flowrate at the site.

Copper continues to exceed SWQS repeatedly at Site 5. *E. Coli* for this fiscal year 2020-2021 and last year's reporting period are less than values from 2015 and 2016 levels as well as lower than values for this reporting period at the other sites. Stormwater Inspection monitoring of this Mixed Use watershed area continues.

### III. Exceeding Water Quality Standards (WQS)

The concentration of copper continues to exceed the SWQS in all sample sites. It appears from the data since 1996 that the copper concentrations, on the most part, have not changed. Sample results for this reporting period showed normal results for copper for the Tucson area with exception to Site 3 when compared to the last few years to see if any trend exists. Site 3 sampler stopped working during a sampling activity and not all bottles were filled therefore not all possible lab testing occurred, including *E. coli* testing, although copper was tested. Although the sampling for site 3 in summer 2020 showed relatively higher numbers for lab results for copper than from past years, it is difficult to interpret these higher numbers as an optimal first flush sample. Therefore for summer sample 11JUL20 at Sampling Site 3, an anomalous reading for copper [Cu: 92 µg/L] was observed; stormwater management will monitor.

The Stormwater Team continues to believe that the higher level of copper at the sites is likely from native background in soils since Arizona is officially the Copper State, landscape materials, and possibly brake dust from automobiles.

The cause of the *E. coli* is suspected to be from birds (aves), bats (chiroptera), cat (feline) and dog/coyote (canine) droppings, and increasing homeless population (*h. sapiens*) activity in the Tucson area. There are considerations by Stormwater Management to perform more frequent *E. coli* testing to differentiate being pathotypes so that sources of *E. coli* can be better assessed. In 2017, PAG had studied the possibility of additional funding for these extra tests and more discussion is expected; additional costs for this type of testing continue to delay implementation. Low numbers for analytes and *E. coli* / coliforms at Site 4 may be due to high flowrate at the site from a significant rain event or that notifications for rain and sampling from the equipment failed to provide optimal timing for sampling and sample was taken after first flush conditions (within a half hour of flow at the site).

In a number of samples, the laboratory could not measure as low as the SWQS's for a number of constituents. Analytes from tested samples that were below detection limits included: cadmium, silver, cyanide, and orthophosphate.

Organic Toxic Pollutants, especially total oil and grease values, all dropped significantly for the reporting period compared to last ten years of data for Sites 1, 2 and 5. Note that Site 4 is industrial use and Site 3 was not tested due to equipment failure. It is unclear whether COVID-19 and associated lessened activities such as vehicular uses and other uses impacted these results.

## PART 11 ESTIMATES OF ANNUAL POLLUTANT LOADINGS

To estimate the annual pollutant load, rainfall totals are collected at each of the five stations, tabulated monthly, and used to calculate the event mean concentration for constituents monitored under the City's MS4 permit, along with the pollutant loading calculations.

Laboratories report constituent values that were below the detection limit as less than the minimum Practical Quantitation Limit (<PQL) or the Minimum Detection Limit (MDL). These values are reported as zero for calculating purposes.

Runoff volumes had been calculated for each drainage area, utilizing the area and impervious fraction developed by Pima County Flood Control District specifically for the Tucson metropolitan area, along with rainfall data collected at each sample site.

Annual pollutant load estimates were developed in accordance with guidance found in the EPA's "Guidance Manual for the Preparation of Part 2 of the NPDES Permit Applications for Discharges from Municipal Separate Storm Sewer Systems." The simple method described in this document was followed. This method involves using the event mean concentrations and multiplying by the runoff volumes for each watershed. The following formula was used to determine the annual load of each pollutant for each drainage basin:

$$L = (R)(C)(A)(N)$$

$$V = (R)(A)$$

L = Pollutant load (tons/year).

R = Runoff (inches)

C = Pollutant concentration (mg/L)

A = Area (acres)

N = Conversion ( $1.65 \times 10^3$ )

V = Volume of runoff (acre-feet).

$$R = (P)(P_j)(R_v)$$

P = Rainfall (inches)

$P_j$  = Fraction of annual rainfall events that produce runoff

$R_v$  = Runoff coefficient

$I_a$  = Impervious fraction

$$R_v = 0.05 + 0.9(I_a)$$

P is obtained and averaged from raw data collected from sample sites where  $P_j$  is calculated from actual rain events at sample sites that produce flow for the winter and summer seasons. In the last annual report  $P_j$  was 0.77 for the summer rainy season and 0.62 for the winter rainy season. It has been updated and averaged over the previous seasons to 0.65 and 0.59 respectfully. Therefore the values in the following tables have changed and are reflected with the updated constant  $P_j$ .

**Table 11.2a**  
**Drainage Characteristics**

Drainage Basin	Area (sq mi) "A"	Impervious Fraction "I"	Rv no units
SANTA CRUZ RIVER	142.96	8.72	8.95
RILLITO CREEK	19.73	0.22	4.28
PANTANO WASH	29.06	0.08	2.44
TANQUE VERDE CREEK	10.91	0.16	1.74
SABINO CREEK	0.6	0.43	0.26
Atterbury Wash (into Lakeside Lake)	11.66	0.06	0.10

**Table 11.2b**

**Total Runoff "V" [acre-feet]** The runoff volumes have changed from the previous reports because the runoff co-efficient (Pj) was obtained from real data at the sample sites and averaged for each of the rainy seasons.

Table 11.3

**Drainage Basin Sizes, Impervious Value, and Rv**

Drainage Basin	Area (sq mi) "A"	Impervious Value "I"	Rv no units
<b>Santa Cruz River</b>	142.96	8.72	8.95
Silvercroft Wash (DL)	13.44	0.12	0.16
West Branch Santa Cruz River (CG)	10.22	0.08	0.12
Hughes Wash (AC)	8.33	0.42	0.43
El Vado Wash (AG)	2.29	0.36	0.37
Santa Clara Wash (AH)	0.39	0.26	0.28
Valencia Wash (AL)	1.64	0.42	0.43
Airport Wash (AW)	24.17	0.09	0.13
Wyoming Wash (BC)	0.7	0.25	0.28
Irvington Wash (BL)	0.25	0.25	0.28
Rodeo Wash (BR)	8.39	0.21	0.24
Tucson Diversion Channel (BW)	43.53	0.20	0.23
Mission View Wash (CC)	1.62	0.48	0.48
18th Street Wash (CL)	3.59	0.42	0.43
Cushing Street Wash (CR)	0.5	0.57	0.56
Downtown Wash (CT)	0.31	0.85	0.82
Arroyo Chico (CW)	11.17	0.52	0.52
West University Wash (DA)	0.76	0.63	0.62
Bronx Wash (DC)	1.26	0.50	0.50
Grant Road Wash (DD)	0.77	0.69	0.67
Krueger Wash (DF)	0.38	0.46	0.46
Flowing Wells Wash (DG)	6.47	0.42	0.43
Ruthrauff Wash (EG)	2.78	0.52	0.52
<b>Rillito Creek</b>	19.73	0.22	4.28
Stone Avenue Wash (HG)	0.6	0.61	0.60
First Avenue Wash (GR)	0.5	0.37	0.38
North Mountain Avenue Wash (GQ)	0.62	0.25	0.28
Tucson General Wash (GM)	0.42	0.34	0.36
Christmas Wash (GL)	3.28	0.45	0.46
Alvernon Wash (GG)	3.24	0.54	0.54
Christopher City Wash (GF)	0.21	0.49	0.49
Alamo Wash (GC)	9.81	0.46	0.46
Swan Road Wash (GD)	0.52	0.42	0.43
Creekside Wash (GE)	0.53	0.27	0.29

Drainage Basin	Area (sq mi) "A"	Impervious Fraction "I"	Rv no units
<b>Pantano Wash</b>	29.06	0.08	2.44
Rose Hill Wash (UL)	2.11	0.49	0.49
Guillermo Wash (UZ)	0.75	0.42	0.43
Atterbury Wash (UG)	16.71	0.06	0.10
Mesquite Ranch Wash (UN)	1.15	0.05	0.10
Civano Wash (UR)	3.07	0.05	0.10
Owens Park Wash (UJ)	0.75	0.35	0.37
Rolling Hills Wash (UC)	1.17	0.39	0.40
Eastview Wash (TW)	0.75	0.17	0.20
Spanish Trail Wash (TR)	1.46	0.10	0.14
Escalante Wash (TL)	1.14	0.08	0.12
<b>Tanque Verde Creek</b>	10.91	0.16	1.74
Udall Park Wash (MD)	1.03	0.35	0.37
Robb Wash (MW)	3.51	0.31	0.33
Este Wash (MG)	2.49	0.30	0.32
Wrightstown Wash (ML)	0.67	0.19	0.22
Reyes Wash (MC)	1.18	0.17	0.20
Hidden Hills Wash (MR)	2.03	0.28	0.30
<b>Sabino Creek</b>	0.6	0.43	0.26
Fahringer Wash (MN)	0.6	0.23	0.26

## PART 12 ANNUAL EXPENDITURES

Expenditures for the many components of the City’s Stormwater Program are funded by City Departments and through City membership, sponsorship and contributions to agencies such as Tucson Clean and Beautiful, Pima Association of Governments, and the University of Arizona. The majority of funds expended on programs benefiting stormwater quality come from the City’s General Fund. Two City Departments are enterprise funded and many of their costs are not reflected in the table below. Stormwater management activities are also funded by the Stormwater Fee on the water bill. It is recognized that a number of costs associated with stormwater protection are not readily available and staff are working toward identifying and developing a tracking mechanism to better estimate these costs.

An estimate of annual expenditures for programs with direct stormwater quality benefit is provided in the Table 12.1 below:

Table 12.1

STORMWATER MANAGEMENT PRACTICE OR ACTIVITY		2017-18	2018-19	2019-20	2020-21
I	Public Awareness	\$724,870	\$461,583	\$1,225,422	\$893,794
II	Public Involvement	\$713,221	\$646,541	\$671,220	\$485,255
III	IDDE	\$32,000	\$181,728	\$130,000	\$2,288,460
IV	Municipal Facility Stormwater	\$2,150,000	\$2,150,000	\$2,150,000	\$359,525
V	Industrial Stormwater	\$35,000	\$15,005	\$35,000	\$69,733
VI	Construction Stormwater	\$275,000	\$415,470	\$275,700	\$190,114
VII	Post-Construction Stormwater	VI above	\$26,267	\$52,716	\$300,231
VIII	Stormwater Sampling	\$29,000	\$181,890	\$43,403	\$106,638
IX	Program Administration & Management	\$374,147	\$259,509	\$310,134	\$557,446
Total Stormwater Expenditures		\$4,333,238	\$4,337,993	\$4,893,595	\$5,251,195

## PART 13 ATTACHMENTS

- Laboratory reports
- New MS4 permit
- New or revised ordinances (none for this reporting period)
- New or revised public outreach (See also updated Tucson’s Operation Splash campaign which includes an extended sandbag distribution program) <https://www.tucsonaz.gov/OperationSplash>
- Stormdrain System Maps – see Map Tucson: open Stormwater layers to view FSO locations, sampling sites and other GIS info: <https://maps.tucsonaz.gov/maptucson/>